Author: Pennsylvania Live Stock Breeders' Association

Title: Proceedings and papers of... annual meeting, 1909

Place of Publication: Pittsburgh, Pa.

Copyright Date: 1909

Master Negative Storage Number: MNS# PSt SNPaAg057.8

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ELEVENTH ANNUAL MEETING

—OF—

PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION

HELD AT

HARRISBURG, PA.

JANUARY 25 AND 26, 1909

JOINT MEETING WITH THE PENNSYLVANIA LIVE STOCK
BREEDERS' ASSOCIATION

PROCEEDINGS AND PAPERS
OF
ELEVENTH ANNUAL MEETING
OF
THE PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION
AND THE
PENNSYLVANIA DAIRY UNION
Held at Harrisburg, January 25-26, 1909

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Secretary	H. E. VanNORMAN, State College, "
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THE PENNSYLVANIA STATE COL

LEONARD PEARSON, B.S., V.M.D.

Dr. Leonard Pearson, Vice-President of the Pennsylvania Live Stock Breeders' Association, died suddenly September 20. At our next meeting a memorial service will be held, and the tributes there paid will be a part of our next Report. For the present we give a sketch of his life prepared by those who knew him best and as it apeared in the American Veterinary Review:

Dr. Leonard Pearson was born in Evansville, Indiana, August 17, 1868. His parents were Leonard and Lucy Small (Jones) Pearson, who were of Puritan ancestry. He died at Spruce Brook, Newfoundland, Monday morning, September 20, 1909.

In 1884 he entered Cornell University, and was graduated in 1888 as a Bachelor of Science in the Agricultural course. He was a member of the Chi Psi Fraternity and the Society of the Sigma XI. While

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In 1884 he entered Cornell University, and was graduated in 1888 as a Bachelor of Science in the Agricultural course. He was a member of the Chi Psi Fraternity and the Society of the Sigma XI. While

INTENTIONAL SECOND EXPOSURE

at Cornell he became interested in veterinary work, and in 1887 he was employed by the United States Department of Agriculture under Prof. James Law, his lifelong friend, in assisting to stamp out contagious pleuro-pneumonia of cattle in the vicinity of Chicago.

He graduated from the University of Pennsylvania, Veterinary Department, with the class of 1890. The following years of 1890-91 he attended lectures in the veterinary schools of Berlin and Dresden and studied bacteriology in Koch's Laboratory and in the Laboratory of the Veterinary Department of the German Army. On his return to America he was elected assistant professor of theory and practice of veterinary medicine in the University of Pennsylvania and in 1894 was promoted to a full professorship. In 1897 he was elected Dean of that institution, a position which he has since filled with conspicuous ability. In recognition of his research work, the university in 1908 conferred on him the honorary degree of Doctor of Medicine.

In 1892 he was appointed non-resident lecturer on veterinary science at the Pennsylvania State College.

He was a member of and attended the Seventh International Congress of Hygiene and Demography, held in London in 1891, and the Third International Congress for the Study of Tuberculosis that met in Paris in 1898, and in recognition of the services rendered in the study of animal tuberculosis he was chosen to preside over the section on animal tuberculosis at the Congress held in Washington in 1908.

He was one of the founders and editors of the "Veterinary Magazine," and the author of numerous papers on veterinary and sanitary subjects. He was a prolific writer and contributor to the literary field of veterinary science, the domain of agriculture, the stock-breeding interests and the whole realm of animal industry and had justly earned the proud title of the leading "animal engineer" of America.

As Secretary, then President, he filled the highest offices in the American Veterinary Medical Association, and served two terms as President of the Pennsylvania State Veterinary Medical Association, and the same may be said of him in reference to the Keystone Veterinary Medical Society. He was an active member and past President of the Guernsey Cattle Club of Philadelphia, Vice-President of the Pennsylvania Live Stock Breeders' Association, member of the State Grange. American Public Health Association, Philadelphia City Board of Health, advisory member of the State Board of Health, and Veerinarian to the State Board of Agriculture. He was a member of Ivanhoe Lodge, F. and A. M., and an active member of the Harrisburg Club, the University Club and the Union and West Philadelphia Republican Clubs. In all these organizations his genial manner won him hosts of friends. In all his association work he was active and aggressive and furnished most valuable assistance in their management and government.

He organized the Pennsylvania State Live Stock Sanitary Board in 1895 and was appointed its secretary and State Veterinarian by Governor Hastings and has been reappointed by each succeeding Governor since that time. He commanded the implicit confidence of all his people, from the Governors to the most humble farmers. Few men were better known throughout the Commonwealth than Dr. Pearson and none were more respected. To those interested with him in the Veterinary Department of the University of Pennsylvania, the State Live Stock Sanitary Board and similar organizations with which his work has been so intricately woven, his loss is felt with the keenest sorrow.

He knew how to think, speak and write, was conscientious, far-sighted, honest, possessed good judgment and enjoyed the general esteem of all who knew him. He was a captivating orator, precise, methodical and clear, and possessed to a high degree the gift of analysis, synthesis and generalization. The many abstract and complex problems filtered through his mind as a pure crystal. Speaking or writing, he reflected the exceptional qualities of his beautiful intellect. There was exactness and faithfulness to the rules of our language and a perfect fitness of words to express ideas in every sentence he used. Dr. Jas. G. Rutherford has well said of him, "Dr. Pearson was in a class by himself among the veterinarians of this continent, while even in the Old World there are few who rank anywhere near him. He was not only a great veterinarian but a great man in many other ways, and one who, had he been spared, would have made a well-defined mark on the national life of his own as well as that of other countries." His work has been unique in character from the fact that through his conception most of it has been created. Much of it has been completed, the greater portion planned and years of intelligent application will be required to carry it to a successful fruition. May the same all-wise Providence Who, in His infinite wisdom, has removed this man in the prime of life, direct those who are to take up his many burdens.

Dr. Pearson's illness dates back two years or more when his family and friends became aware of the fact that his manifold duties and responsibilities were telling on him. With his energy already taxed to the utmost, his exhausted condition was greatly aggravated by the additional worry and effort incident to the outbreak of foot-and-mouth disease in Pennsylvania in the early part of the past winter. This, combined with his efforts in securing, from the last Legislature, much-needed appropriations for buildings and maintenance for the Veterinary School and also funds for the administration of the work of the State Live Stock Sanitary Board, called forth the limit of his capacity. With this marvelous amount of work accomplished, it was arranged to relieve him of much of the routine work of his official duties; and, after the narrow escape of his mother and himself from asphyxiation with illuminating gas due to his experiencing a fainting spell while caring for his mother who was at that time ill, he was finally persuaded to take the rest which up to this time he had considered impossible. After recovering sufficiently

from the acute effects of the gas poisoning, he decided upon a sea voyage, a form of recreation to which he was most partial, and accordingly sailed on a coast line steamer for Savannah in the early part of July. On his return, he immediately embarked for England, returning by way of Halifax, where, on the advice of his physicians and friends, he decided to remain for an indefinite period. He was later compelled to go to Newfoundland on account of an attack of hay fever, to which he was subject, and at the time of his death was sojourning at the Log Cabin, Spruce Brook, a secluded place on the southwest shore of Newfoundland. The latest communications received from him indicated that he was improving and that he hoped to be able to return to his office in Philadelphia within a short time. A few hours prior to his death he suffered a sudden collapse which was followed by a hemorrhage that resulted in death in a few minutes. It was gratifying to learn that he had received the best of attention, medical and otherwise, during his stay at the Log Cabin, which was found to be an ideal place for rest and recuperation.

JOINT MEETING
OF THE
Pennsylvania Dairy Union
AND
Pennsylvania Live Stock Breeders' Association

Proceedings of the Dairy Union

Address of President H. E. VanNorman

On this, the eleventh annual meeting of the Pennsylvania Dairy Union, I am glad to see as many present as are here. There is an opportunity for each of us to get much from this meeting. But it seems as if more interest might be taken in these gatherings by the farmers and creamerymen of this great State. The growth through these years has been slow, but there has been unmistakable growth.

This is hardly a year when we dairymen of Pennsylvania can meet each other with cheerful countenances. The conditions confronting us are not cheerful. The drought and the price of feeds have a tendency to make our dairymen slightly pessimistic.

This is a great State, but where it can spend millions in fostering other industries, and making improvements, it gives nothing comparatively to aid the farmers to put their business on a paying basis. Unless the dairyman is situated where he has a special market, he produces milk at a loss. Someway the notion is current with the consumer and the city press, that the only expense to the farmer in producing milk is to milk his cows and deliver his milk, and if there is any profit it must go to the middleman. It is safe to say that the production of milk costs one-third more now than it did three years ago, and for this reason some of our best dairymen are going out of the business. Something must be done or the American dairyman will be reduced to the condition of the European farmer.

Isn't it possible for us to use our intellects and having determined the actual cost of a quart of good milk to join hands and demand a fair profit for our product when it is placed upon the market? The laws and Board of Health are continually forcing the farmer to take better care and to add to the expense of producing milk, but where is he to be reimbursed for this work if he does produce the extra clean and wholesome milk which the consumer demands?

The dairyman of the East has always bought most of his protein feeds, but it looks as though this condition must gradually change and the eastern farmers must grow upon their own farms the necessary feeds to produce a balanced ration for the dairy cow. It is certainly a problem for the dairymen to consider.

Of the 1,200,000 cows in this State probably seven-eighths of them are the common cows, which more than eat their heads off every year, and which are not capable of producing 150 pounds of butter fat a year. If the scientific student of dairy husbandry will aid us in raising the standard of these cows so that the product can be increased by even one-half, we will find the problem of feeding less complex and have a better opportunity for a little profit.

Canada, New York, Minnesota and

many other States have appropriations to send experienced butter-makers around to spend a few days each year at every creamery. These men not only assist the buttermaker to make a better article, and to overcome the difficulties which confront him, but also talk with the patrons, interesting them in bringing the milk and cream in better shape.

This is a matter which needs our attention and which should be discussed here, and which we should continue to discuss until something is done along this line.

As a dairy State, Pennsylvania ranks second. Her dairy products alone were over $40,000,000 last year.

This dairy meeting is ours and we must get from it all we can. The best way will be to be interested in everything, to ask questions, to study the exhibits and to take what we can of practical value for us in our work.

Owing to the noise adjournment was made to the Board of Trade rooms.

HANDLING STARTERS

L. H. COOLEY

The subject of "Handling Starters" is, in my opinion, one of the most important features in the manufacture of a good butter, and there seems to be a number of buttermakers yet in this State who do not use a starter, or if they do it is in the form of sour cream or buttermilk.

I have not been very successful in making a good butter with these starters. Now, in handling starters, a number of the boys seem to think that there is some trick in making a good starter.

It isn't the lack of knowledge that causes poor starters usually, but rather the fact that we do not put our knowledge into practice. The easiest way to make a starter does not bring a good starter.

In order to obtain the best results we must propagate our mother starter independently of the large starter can. You, of course, understand that it is absolutely necessary to use sterile milk for these mother starters, and for setting new cultures. But still too many of the boys are tempted to take this milk from the large starter can, after it has been heated of course, but at the same time probably less than 95 per cent. of the bacteria have been killed.

As I have said, the mother starter must be run independently of the larger starter can, and with the utmost care. Most any good glass jar will do to run the mother starter in. There are starter bottles with glass stoppers now on the market, which I think would be a good thing. But I am using the one-quart quick seal glass top fruit jars, which I find very convenient. I use in these jars either a selected whole milk or a good skim milk, for the mother starter.

Now comes the question of sterilizing the contents of these jars. All buttermakers, of course, have their own custom or some particular way to do this work.

My idea is to make a box-shaped vessel, either of galvanized iron or copper, about six inches wide, twenty-four inches long and ten inches deep, which would hold six of the jars that I spoke of. Now solder a piece of short pipe in the end next to the bottom for the steam inlet, then solder a piece of pipe in the other end for an overflow, just low enough so the water will not cover the jars. Place about one inch from the bottom some kind of a slatted screen for the jars to rest on, so they will not set on the bottom of the vessel.

Build a box of wood around this, leaving it an inch or two larger on all sides. This space can be filled with mineral wool or some insulation material. Cover with a good cover, put a hole down through the cover so a thermometer can be inserted into one of the jars which is left uncovered and filled with water, so you can readily see at any time just what temperature you have. Thus the jars can be sterilized in the boiling water any length of time desired.

With this box well insulated, and after sterilization is completed the water can be tempered to the temperature desired, and the temperature maintained for some time. All jars of milk intended for mother starter should be sterilized two days in succession before inoculating. I would have small brass tags numbered 1, 2, 3, 4, and so on, fastened to a small wire snap so they could be easily snapped to the wires on the jars, and could be changed as the jars are used, and you would know at all times just which jars were to be inoculated next.

After cooling to the desired temperature (I would say about 70 or 75 degrees) inoculate with about one-half to one per cent. of the mother starter, and agitate gently by giving the jars a rotary motion. Repeat this agitation occasionally during the first few hours, but not after it begins to coagulate.

When the milk begins to coagulate nicely, set in some cold place until used. Now, I wonder how many of us have a large starter can! I hope the majority have, but I am afraid not. If you have so much the better, but if you haven't you can make a starter in milk cans very successfully; but, of course, it would make much more work and takes a careful person to handle it. In the large can I would sterilize the same as in the mother starters, to 200 degrees; or more and hold at that temperature at least one-half hour, then cool to the temperature desired.

If in winter, when you only separate or receive cream every two days, it would be best to sterilize the starter milk again on the second day, cooling to 70 or 75 degrees, and inoculating with about one or two per cent. of the mother starter; agitate well, and at intervals.

One thing we must watch very carefully, and that is that both the starter and the mother starter do not get overripe. There seems to be only two ways to handle the starter without giving us this trouble:

First—To set the starter about 9 o'clock in the morning, so it will be ripe in the afternoon and can be placed in the cold room. Very few cold rooms are built so as to run a large starter can in, and in such case it can be emptied in some well-sterilized milk cans and set in the cold room.

The second way. and the way that I think most practical, is to set the starter in the afternoon at such a temperature and inoculate with such per cent. of mother starter that it will be ready for use in the morning. I am using 10 to 15 per cent. of starter. I am a great believer in good starters and should I happen to have a poor starter I would rather feed it to the pigs than to try to make a good butter with it.

The President—This is an interesting topic and we should have some discussion of it. Let us hear from some one and get up a little enthusiasm and discuss this back and forth for a few minutes.

Mr. William Marshall—I would like to ask how to keep tab on the overrun?

Mr. Cooley—The only way you can keep tab on the overrun, is to test your skimmed milk and your buttermilk and take a drip sample of your milk as it comes in, also of your hand separator cream, if you have hand separator cream at all, and then test your butter for moisture, and, of course, if you keep all those tests, then you know how much fat is delivered that morning; then, when you weigh up your butter you know how many pounds you have made and the difference between the amount of fat delivered and the amount of butter made is the amount of overrun in pounds, then, of course, it is a matter of percentage to get the overrun for the day.

Mr. Marshall—It seems to me that it would then be necessary to weigh the cream that you had received each day, would it not?

Mr. Cooley—Yes; if you received any hand separator cream, of course, you must weigh it. If you separate it in the factory take the weight of the milk, test that, that would give you the amount of fat you had received, and if you tested the skimmed milk that would give you the amount of fat you had lost in separating.

Mr. Marshall—One question more I would like to ask the gentleman is, whether he thinks that drip sample would be as accurate a way as if you would weigh your cream that you received during that day, if you would weigh that cream after it was separated and then test that cream, get the percentage of fat that that cream contains, then would you not be able to get at the overrun more accurately than you would by a drip sample?

Mr. Cooley—Mr. President, that would give you the theoretical overrun very well, but the actual and theoretical, of course, are two different things, and when you have tested your cream only you do not know how much fat you have lost in the separation, but you must pay your patrons for it just the same. As I have said, the only way to get the actual overrun is to take this drip sample, because while you may have lost a whole lot of fat in your separator you have got to pay your patrons for it just the same. That would be all right theoretically, but in actual work I think the drip sample would be preferable.

The President—Any more questions?

Mr. Thompkins—Mr. President, a question in the line of moisture is this: In some creameries of the State we have to churn at a very much higher temperature than 52 degrees, which is the ordinary churning temperature of cream. They advise us to use our wash water two degrees higher than the churning temperature. I would like to put the question in this way: Do you believe if churning at 58 degrees we should use 60-degree wash water to incorporate the right amount of moisture, or do you believe in washing with a cooler wash water to bring the butter back to its normal temperature again?

Mr. Cooley—Mr. Thompkins, I do not believe that the temperature of the wash water has as much to do with the incorporation of moisture as other things. While I do not think it is well to go too low on the temperatures, I do not think two degrees lower will hurt the butter any, and yet you will incorporate the moisture just as well if other things were all right.

The President—Are there any other questions? If not, we will take up the next paper.

OBSERVATIONS

C. P. VANDYKE, MILAN, PA.

The underlying principles of buttermaking are the same today that they were 25 or 30 years ago, the only change being that methods have been improved upon, the place of manufacture has been transferred from the farm to the creamery, and modern machinery takes the place of that formerly used. The creameryman deals with a composite of many dairies and where the make was computed in pounds then, now we hear of tubs, boxes and carloads.

In those days, while the buttermakers were not theorists nor understood the meaning of technical terms, yet they knew that certain conditions brought about certain results and they were faithful to watch them, and the product they turned out would put to blush many of the buttermakers who have had the benefit of the modern training.

Those who can remember back over that period can recall the dairy room, usually the front basement of the house with its whitewashed walls of stone, flagstone floor, on one side of the room the racks holding the Orange Co. pans, cool spring water running around and under the milk, the place kept scrupulously clean, and everything run as scientifically as the modern plants of today.

The knowledge of buttermaking was the result of observation in daily practice, and they labored unconscious of the myriads of bacteria that swarm on every hand; the term sterilization was not used, yet all utensils were thoroughly scalded and tinware was exposed to the rays of the sun to purify them; terms ripening and acidity were not used or understood. I can remember hearing a leading Jersey breeder of the famous Bovina town laugh an Institute Instructor to ridicule because he spoke of letting cream ripen to a certain degree of acidity.

How many of us today, if placed back 25 years, would measure up to the buttermakers of that time? How much butter made today could be packed in 100-pound firkins, stored in a cellar of moderate temperature and come out six or eight months later, showing as good quality as the butter of that day?

I believe in being optimistic, looking forward, not backward, but what do the market reports teach us? Twelve months in the year the same story is, "Market overstocked with undergrades." We are told that every year the supply of fancy butter is smaller.

This is not a theory, but a cold, stubborn fact, and how much do the buttermakers of Pennsylvania contribute to this state of affairs? Where does this butter come from? Is it wholly a product of the East, or, are we, on account of being near the great markets, getting credit for it, no matter what section of the country it comes from?

I was pleased to see in the program that the buttermakers would have this session by themselves, and it seems to me that the time has arrived when formality should be cast aside and this and similar questions thoroughly threshed out. We have heard it charged that the buttermakers of the East are not progressive, that they are not keeping pace with the advanced practice of the day, in other words, they are behind the times. Is this true? Are the buttermakers to blame for the increase in quantity of butter that is off in quality? Or are these conditions over which the buttermaker has no control, responsible?

I know enough about the buttermakers of Pennsylvania to assert that there are as good buttermakers here as any State can boast of, but there are those who are not a credit to the profession. This last class, of course, is not represented here.

I believe that by these discussions enthusiasm will be aroused, and we will go back to our work benefitted and determined to do better work, and help in raising the quality of Pennsylvania butter.

It is a pretty hard proposition for a lone buttermaker working 12 or 14 hours per day, seven days in the week, to get very enthusiastic, but there are men doing that very thing, and their cheerfulness goes a long ways towards insuring their success. No morose-despairing person will ever be much of a success as a buttermaker, even the minute bacteria that work while we sleep, to develop the delicate flavor and aroma so much desired in butter, must have agreeable surroundings and will not thrive under opposite conditions.

Enthusiasm is contagious. Make a study of your work, master it, believe in it and your enthusiasm will act as a leaven to brighten the condition of some fellow-worker. Did you ever think of the influence the appearance of your creamery has upon those who come in contact with it? Won't the patron who drives up to your door every morning and finds everything spick and span be more painstaking to deliver you a good article than if otherwise? If your tinware is bright and shining, won't he be more likely to keep his in same condition? On the other hand, haven't you been in factories where everything seemed to be going slipshod? The buttermaker making excuses that things are upside down today? Finger marks on the walls that make you think of the Black Hand? Haven't you seen dirt in the corners that was there yesterday and the day before, and if you visit that factory every day in the week the same dirt is there to greet you? True, the creamery must of needs be sloppy certain times in the day, but it doesn't require an experienced eye to discover whether it is wholly today's or is being carried along as a sort of asset. You can't afford to have your place untidy. A great deal has been written about educating the patron to deliver better quality of milk and that the education must come largely through the man at the weigh can. How much argument do you imagine it would require to offset the impressions made by a dirty creamery? What incentive to put forth extra effort to deliver milk in the best possible condition and then see it pumped through filthy pipes at the creamery? Patrons are, as a rule, reasonable. When they see the man at the creamery doing all in his power to have things right they will co-operate with him. The creamery business is not a one-sided affair. The interests of the creamery and patron are identical, and the clearer the understanding is between them the more pleasant and harmonious the relations will be.

For the good of all concerned too many men have charge of factories who should be helpers. No person should be entrusted with the manufacture of butter who has not served an apprenticeship. Too much is at stake, not only the quality of the product, but your own reputation. Wouldn't it be better if the buttermakers could only obtain a license after serving apprenticeship and satisfying the proper authorities that they are competent? The man who is most successful must be of varied qualifications. He must be a machinist, engineer, plumber and above all, a diplomat.

Young men are taking hold of creamery work with little knowledge of what is required; they are disappointed, have no liking for the work and fall into complaining because the work is so confining and the surroundings are unpleasant. True, the work is confining, but the surroundings are largely what he makes them. My observations have been that the man whose heart is in the work, who puts duty before convenience, is the most successful. To such men duty becomes a pleasure.

The President—Are there any questions?

Mr. Thompkins — The thought was brought forward that butter years ago was of better quality than it is today. We, as buttermakers, certainly believe that the world is moving forward in the line of machinery, morals and other things. I believe this is true then, that the tastes of people are improving, just as much as we consider the butter of today is of a poorer quality than that of years ago. The people years ago were not so particular about the butter as people of today; therefore, there was very little said about it years ago, and today there is a great deal said about it. We have men today doing scoring of butter. Years ago that was practically unknown. Country butter was taken in, they tasted it and if it did not taste of garlic the man passed his opinion that it was all right. I would like to ask the question here today whether that is not the case rather than the proper quality of butter? There are some cases where butter is poorer today. Where we are trying to incorporate into butter so much moisture there is butter put on the market that is poor.

Professor Van Norman—It is my observation that the best meetings and conventions are those where the meeting is made up by the participation on the floor and where we have just enough eminent spellbinders to give you an excuse for getting together. To make the meetings interesting you must get together and discuss these things among yourselves and then you have the best meeting. I have heard it said that the New York State meetings are going backward. Why? Because you have so many spellbinders and little real convention. We are going to avoid that. We have not invited a lot of eminent speakers for this meeting, and if it is not a success it will be your fault. The Convention is going to be a success and because you have not talked in meeting before is no reason why you should not talk today. I hope you people will argue these questions back and forth, because that, really, gentlemen, is what makes a convention a success. I know all of you are modest and do not like to hear your own voices. You have got to overcome that part and help to push things along. The subjects presented so far have material enough to have an hour and a half discussion. Before I see this thing die for want of discussion I will begin to call names. I will call them gently and then try to call them in some other way to get you talking back. I know when some one says something somebody does not believe, and another one defends it we will have a convention worth while. We need a scrap to start this thing up. I hope somebody will do it before I call names. Mr. Van Dyke, Mr. Cooley and Mr. Tompkins, and a whole lot of others whose names I can call, are doing actual, practical work. Let us have discussions here, because in the discussion somebody makes good suggestions that help the other people along.

Mr. Cooley—Let us hear the question just put before the house about this butter, whether the butter is getting poorer or people getting more critical.

Professor Van Norman—I believe there is an element of truth in both of these statements, that the buying public is becoming more critical. I believe some of the butter that was counted the best butter made 10 years ago or 20 years ago, is still the best butter, and I believe some that think they have the best butter today will not stand comparison with that which passes muster in our markets. On the other hand I believe there are some who have gotten tired and the changing conditions have been too many for them and they have not been able to meet them. Now, everything has its ups and downs. A few hundred years ago religion was the only thing talked about. Today our preachers are bemoaning the fact we are forgetting our religion. The pendulum swings back and forth and it may be our butter-making pendulum of enthusiasm has been swinging backward. I believe it will come back again. I do not care how poor the conditions are, we are here to discuss those conditions and see how we can get better butter under our conditions. It has been said that the western man is never satisfied with what he is, but is always trying to get something better. We need that spirit. We Pennsylvanians have grown up in one community and know our own way, and it has been a good way, and we are apt to be satisfied with it. The Western fellow does not know where he grew up—he has no common home. I have already lived in five States and I am not as old as some of the other fellows, but I am not tied down to tradition. The best way we people can get out of this scrape that we are in now is what we want to discuss. Now, then, you fellows, back-woods creamery men, 40 miles from the railroad, if there are any such, and farmers who get rotten cream, is what we are looking after, to know how to bring in cream a little less rotten. I know if you talk these things over here you will get a clue. Because you cannot get a 97 score is no reason why you cannot make it a little better than you are making now. When you make one point "scrap" for the next point. In our scoring work at the college there are about 15 or 18 who are sticking to the end, and it has been gratifying to Mr. Larson and myself to see that butter come in, and to see those who made the poorest butter at first go right along up and getting better. On the other hand, we notice some others who do not seem to be able to make progress, but who seem to be discouraged and quit. We are not going to quit, we are going to keep on. If we have helped two or three to make better butter we feel that we are justified in so using the State's money. In the long run the man who makes the best butter is the man who is surest of the market, if he does not make the extra price. When there is a glut in the market the fellow who makes the best butter is the one that sells. When there is a scarcity of butter the one who makes the best butter gets the highest price. I am not discouraged; I believe we are going to make some improvement yet. To me, one of the most encouraging things in the meeting, is that in spite of the vicissitudes this morning we are able to shift our meeting and go from one hall to the other and pull away from those exhibits a representative gathering like this. If, out of this, will come a discussion and make an interesting and agreeable report, I am sure I have received encouragement enough to keep on in my efforts.

Talking is my long suit, that is what they pay me for at the College, but I do not want to do more than my share at this meeting.

Mr. Marshall—I never got pay for talking and am not able to talk very much, but these meetings are very interesting to me and I like to help them along. Mr. Van Norman spoke about the scoring contest. I have wondered if it would not be more interesting to the ones who are taking part in sending samples to State College to be scored if they were given the number of the scores that had been made. Now, I believe it has been customary to send to those interested their individual scores. We have got no way of knowing whether there is one sample or a dozen, or two dozens samples being sent there. Probably we get some little information from the papers we read, but it seems to me it would help to keep up the interest.

Professor Van Norman—It is a good suggestion. We will be pleased to send scores to them. We assumed they were all reading the papers and getting the benefit of the scores except two or three who were unfortunate in getting a low score, and, of course, they do not want their names published.

Mr. Marshall—I would like to know how he would recover butter fat in the buttermilk after he had churned it.

Mr. Cooley—I do not mean to say we would recover it.

Mr. Detweiler—Does the percentage of the butter fat in the cream have anything to do with the percentage of moisture after it is churned?

Mr. Cooley—Yes; I think it does to a certain degree. Of course other things help to govern the moisture but the percentage of fat in the cream, if you have heavy cream or fairly heavy cream, anything from 25 per cent perhaps up to 35; if you have that cream the butter comes in a different shape, comes in irregular granules and will hold the moisture better, and you could more easily incorporate it in the heavier cream than in the light cream.

Mr. Tompkins—Is it necessary, with a perfectly first-class cream, to wash that butter after churning, or to work the salt out?

Mr. Cooley—A great many creameries wash the butter and some do not. Can they get the butter with as good a flavor that will stand the test after standing several months in storage without washing the butter?

Mr. Van Dyke—My experience has been that it is necessary to wash the butter. I would say, yes, wash butter.

Professor Van Norman—Why?

Mr. Van Dyke—You cannot drain the buttermilk out.

Professor Van Norman—What do you want to get it out for?

Mr. Van Dyke—The nature of buttermilk is to deteriorate.

Mr. Estig—Fifteen years ago I worked with a buttermaker who was opposed to washing butter. He said it washed out the good flavor, but he had to work it twice or three times in order to get the buttermilk out. He would salt it, work it a minute, set it away and the next day bring it out and work it, and the next day work it again until he got clear brine. In that way you make a lot of work but the result was the same, he would have to get the buttermilk out before packing. My experience has been, I can make better butter with less work by washing it. I never wash it but once, and I have good spring water. One washing after churning at the right temperature is sufficient. Mr. Cooley's remarks in regard to the over-run,—I know he did not mention in particular about the temperature of the milk before it was skimmed. I found that before I had a good heater that I could not get an average over-run in the winter, cool weather, when milk was coming to the creamery with ice in it, at a temperature of perhaps 40 degrees. The average heater, such as was on the market then, was not sufficient to heat the butter fat in the milk so that any separator could do thorough separating.

Professor Van Norman—Your loss in over-run, you consider, was due to the loss of fat in the skimmed milk?

Mr. Estig—I do. A great many creameries and buttermakers are handling fat because, perhaps, like myself, they are working in a co-operative creamery. I had a little pipe costing $10 with direct steam running into it, but I finally got a Twentieth Century heater. The agent told me: If you cannot save enough in one year with the milk to pay for that, I leave it to your figures—I will give you the machine. I noticed right there our over-run came up to pretty near where it should be. During the past year, at our annual meeting day before yesterday, our Secretary said, the over-run for a year was 16.67 per cent, but he did not figure on one hundred and a little over of cream or the butter fat in it.

Professor Van Norman—That would reduce the over-run slightly. It would still be over 16 per cent.

Mr. Estig—It was 16 2-3, with that out. About the butter scoring contest, that, I would say, hit me a little. I never entered that. I have watched it; I take the paper, and I know what the score is, although a couple of men from our county scored the highest. I feel proud of them. I think dairymen and creamerymen of Pennsylvania can be proud of Mr. Van Norman's work. We have as good a man as can be at the head and I want to impress it upon all creamerymen and dairymen that they should co-operate more freely with him. The State is willing to help you if you will only ask it. Anybody can know what the scores are if they are up-to-date and reading the papers that they should read.

Mr. Cooley—I would like to ask the gentleman who just spoke if he thought the objectionable matter of buttermilk will be removed by working and then left to stand and work the next day, and so on, until it has all been removed.

Mr. Estig—I say the salt would remove the moisture and you should work again until the buttermilk was worked out and you get the clear brine.

Mr. Cooley—Was it the moisture you wanted to get out?

Mr. Estig—He was a first-class man but he never washed his butter.

Mr. Cooley—What I wanted to get at was, don't you think the casine was the most objectionable? Do you get that out of the butter by working it until the brine is clear?

Mr. Estig—That would be the objectionable part. I will say this, he did not get his butter in very fine granules when he stopped churning. He just turned the butter out and salted it on the table, used an ounce of salt to a pound of butter.

The President—Is not that the old method of 20 years ago; they worked the butter, washed it, then let it stand until the next day, and washed it?

Mr. Estig—I did not agree with him, either. He thought it was the only way, and, of course, I was the helper and had to do as he told me. I never practiced that part of it when I got to running on my own account.

The President—Are there any further questions? If there are none, we will take up the other topic, "Moisture in Pennsylvania Butter," by C. W. Larson, of State College. We will ask Mr. Larson to go over his talk again.

Professor Van Norman—The question was asked before you came in, Mr. Larson, whether it is praticable to get the larger over-run where it is necessary to churn at high temperatures, say at 58 or 60, because of lack of facilities,—under those conditions, must a man still have his wash water the same temperature as his butter, or have it below the temperature of his butter?

Mr. Larson—If he could not cool it otherwise he could put ice into the churn just as the butter breaks. If you have to churn it warm use ice in the churn. This is not the best way, but is necessary sometimes.

Professor Van Norman—Suppose they do not have the ice?

Mr. Larson—If they cannot control conditions enough to have the cream in condition to churn there is something wrong and I know of no remedy for it. If you cannot get the cream cool enough to churn there is nothing to be done, of course. I would not want to chill it down afterwards very much, because if you do, you will get a crumbling body.

Mr. Cooley—Would you still have the wash water above the temperature of your buttermilk in a case like that?

Mr. Larson—No, I do not recommend having it any higher ordinarily than the temperature of the buttermilk as it is drawn off.

Mr. Cooley—Would it not be better to cool it two or three degrees?

Mr. Larson—In summer sometimes it is necessary to do that.

Mr. Stokes—By putting ice in the churn and reducing the temperature of the butter so rapidly, would you not destroy the texture of that butter, not considering the impurities in the ice?

Mr. Larson — We do not ordinarily recommend putting ice in the churn, but this method is better than allowing butter to "break" when so warm.

Mr. Stokes—Does it not break the grain in churning the butter?

Mr. Larson—It does not.

Professor Van Norman—What is necessary that you shall not?

Mr. Larson—You finished the churning and add it to the churn just as it breaks and finish the churning with the ice in. If you put it on the butter after it is already formed you are going to have trouble.

MOISTURE IN PENNSYLVANIA BUTTER

By C. W. Larson, State College, Pa.

When I met with you a year ago the question of "Moisture in Butter and Its Relation to Over-run" was discussed. I then made the statement that I believed the Pennsylvania buttermakers were not giving enough attention to the question of over-run and moisture. An 18 per cent over-run, I pointed out, should be obtained as an average for the year, and that the amount of moisture necessary to secure this over-run, if properly incorporated, would not injure the quality, but in most cases improve it. This, in general, was disputed and the statement made that butter with an over-run as high as 18 per cent would be discriminated against by the Pennsylvania consumers on the grounds that it was too wet. I then promised to make a study of the composition of our butter, the creamery methods, and the exact demands of our markets in respect to moisture. I have done so and will first speak of the moisture as I found it from hundreds of analyses of butter from all parts of the State. The average of all the analyses I found to be only about 11 per cent, many below 9 per cent, and a still larger number with less than 10 per cent. I have also analyzed all the butter that has been entered in the bi-monthly educational contests during the year and have some very interesting observations. In the first place, I am gratified to know that only one has exceeded the lawful amount of water, getting about 17 per cent., but this high moisture was only obtained by accident for the maker always before and after that time received a very low test. The average for the year in the contests is about 11.3 per cent. I have compared these averages with corresponding contests in some of the Western States and find that our butter contains from one to two per cent less water. I also collected a number of samples of Pennsylvania butter that was bringing the highest price on the Philadelphia market and found that it contained on an average only 10.57 per cent. The butter made in our State, therefore, we must conclude is low in percentage of water.

I next undertook a study of the relation of the texture and body of the butter to the moisture content. The butter entered in the contests was used for this study. After the butter had been scored by the judge, I placed all the tubs on a table and left them for two hours at room temperature—about 70 degrees. The butter was then examined with a trier, looking particularly to the firmness of the body and the amount of loose moisture present. The most striking fact observed was that only a small percentage of the samples contained over 14 per cent moisture, but of these nearly all were criticised as having either weak body or loose moisture, and in some cases both. At first thought this would lead one to believe that it was not possible to have as much as 14 per cent and still have a good, firm body to the butter, but, looking further we noticed that some were incorporating as much as 14 per cent each day and had butter with excellent body and that was apparently dry. I conclude from this, therefore, that if it is possible for some to obtain this amount of moisture, without injuring the quality, it can be done by others. But it is true, nevertheless, that most of the makers who have sent butter to the contests with high percentage of water do not have the correct methods and do not have the water properly incorporated; and, further, it is not only the butter with high moisture that was so criticised. The very weakest and most slushy butter in the contests was in each case that which tested less than 12 per cent of water. In the December contest, although the average moisture was less than 11.5 per cent, still over 75 per cent of the tubs of butter were cut from one to three points for having weak, overworked body. This is a much higher percentage than we had in the contests during the summer months, and shows that there is something wrong with our methods of churning. We required a record of the making of each tub of butter, and from a study of these, I find that there are as many different methods as there makers. The number of revolutions butter was worked, for instance, was from 8 to 50 revolutions. This, of course, should necessarily be varied some with the different makes of churns. I also find that the wash water is, as a rule, not tempered, but is used as cold as it can be obtained from the well, either winter or summer. This, I believe, accounts for the higher percentage of samples with leaky body during the colder months. I believe that with two changes in our methods a large part of the difficulty with over-worked and leaky butter would be avoided. Firstly, I would temper the wash water to at least as high a temperature as the buttermilk when it is drawn from the churn, especially during this season of the year; and, secondly, I would leave some water in the churn during the salting and working. These two changes, I feel sure, would lessen the danger of injuring the body of the butter, and at the same time the possibility of having the butter mottled would be greatly lessened. From a further study of the Philadelphia market, we find that there are several large makers who are putting butter on the market and selling to the most critical trade and are incorporating at least 14 per cent of water, and butter with this amount properly incorporated when sold on other markets in this State is not objected to. I, therefore, feel that the statement I made a year ago will apply to Pennsylvania as well as any State, that a 14 per cent moisture at this time of the year, especially, would be more satisfactory than a 11, or 12 per cent.

We have hesitated to advocate higher moisture in the Pennsylvania butter because we knew so well the results of the high moisture cries in many of our Western States. It is unknown to many of you, perhaps, but it is true that one of the first and foremost requisites of an applicant for a position in those creameries is his ability to obtain a high moisture and a high over-run. The fruits of this are, of course, obvious. The butter has been overloaded with water and the quality injured. Besides, hundreds of thousands of dollars have been paid as revenue and, in many cases, the creameries have gone into the hands of the receivers through the greed of the maker for an unlawful amount of water. If a little water brings good profits, they say, more will be better, and it is for that reason we have hesitated to advocate the increase of water in Pennsylvania butter. Now, cannot we, buttermakers of the State, go at this in a different manner and be satisfied with a reasonable amount of moisture, but never overlook the quality? I do not advocate a high moisture nor do I think a good grade of butter can be made each day when the high moisture is the foremost thought in the mind of the maker. I do believe, however, that the amount could be increased without in any way injuring the quality, and that the buttermakers in this State must give more attention to this subject and not be satisfied until the standard of over-run is greatly raised. An increase of two per cent,—and this could easily be obtained,—would add each year over $1,000,000 to the dairy wealth of Pennsylvania.

I next wish to speak briefly of the methods of incorporating moisture. A great deal of study has been given this subject, and many experiments have been made by the various agricultural colleges. Every maker who has sought to increase the moisture content of his butter has also studied the various theories, but with all this we do not know just what are the factors which influence the moisture content and why the different methods bring the results that they do. It is certain, however, that we do know enough of the factors and their effect to be able to control the composition of our butter to within the limits of one per cent from day to day. Every maker should make a study of the problem under his own conditions. Three factors I might mention which, if controlled, make it possible to incorporate almost any amount of moisture. These stated

briefly are: The amount of working, the temperatures, and the presence of water during working. There are other important factors but they are mostly included under these mentioned. For instance, the amount in the churn is a very influential factor, but as the amount in the churn is lessened or increased the amount of working is also lessened or increased.

In conclusion, I wish to emphasize the necessity of having some method of testing for moisture if a study is to be made. Do not try to increase your moisture content blindly. We now have on the market two or three tests for moisture that are inexpensive, simple, and are accurate enough for practical use.

Mr. Larson—This covers in brief what I have to say about "Moisture in Butter." If there are any questions I will be glad to answer them.

Mr. Callahan—If you had cream warm enough to make soft butter, would it not be well to add the ice?

Mr. Larson—No, it would take too long to churn, if you put it in the churn. If you see it is going to break too soon and come out soft then I would dump a small amount of cracked ice into the churn.

Mr. Callahan—If your cream was above 65 and you had no other way to get it down?

Mr. Larson—It should not be that high. Is it not possible to cool it with water or any other method before you churn?

Mr. Callahan—Sometimes when the temperature runs up from 60 in the morning to 95 by 10 o'clock?

Mr. Larson—It should be cooled down lower than that.

Mr. Harrington—What moisture test do you think is the most practical?

Mr. Larson—We have three tests on the market that are very satisfactory, I believe, for practical use for creamery purposes, the Irish test, if used rightly, will give you fairly accurate results, accurate enough for all practical use; but it is absolutely necessary that you study the "end point," the time to stop your heating. In the first place you must not have too hot a flame and must watch your beaker, watch it as it is foaming and stop it as it stops foaming the first time.

Professor Van Norman—For the benefit of those who do not know the test by name describe what the Irish test is?

Mr. Larson—The Irish moisture test outfit is simply an aluminum cup, an alcohol lamp and a set of weights. Ten grammes of butter are used. The butter is placed in this little cup and is heated slowly for a short time, until all the moisture is driven off. The end point is at the time the moisture is off. The butter will foam up and just as it foams up and goes down I find is the right time to stop, and if you stop at that time it will be very near the official test. The paraffine method, as it has been modified now by the government, is giving very good satisfaction. There is less danger of overheating in this method, because it is the same principle as the Irish except that the cup fits in a pot of paraffine which remains at a constant temperature, and there is no danger of heating it too high.

The Farrington high-pressure oven, which is a little oven fitted up on the steam line of your boiler, is also very good. It is more expensive than the others and takes more time to make a test, but the results are good. Gray's moisture test I have not been able to get good results with; there are too many chances of error.

The President—You consider the Irish test the most practical of any on the market?

Mr. Larson—No, I do not think it is any more practical than the paraffine method. It is the same principle, only the danger of overheating is overcome by the paraffine method.

Mr. Van Dyke—Do you think the butter can be heated too rapidly?

Mr. Larson—Yes, in butter-fat there is eight per cent of volatile fat and if you heat it too rapidly there is a chance of some of it being driven off and you will not get a right test. If you heat it too long and get it browned or black the test will be too high.

Mr. Mott—I would like to ask you what is the difference in the time consumed in the Farrington, or Gray's, or these other tests; which is the most simplified for buttermakers' everyday use?

Mr. Larson—A high-pressure oven of course takes a shorter or longer time, depending upon the amount of pressure. For instance, if you have 75 to 80 pounds pressure on the oven, the boiling point will be increased to 260 degrees up at State College, in the mountains, and for that reason the higher pressure you have the higher temperature. At that pressure, about 20 minutes in the oven, while with the Irish test or a paraffine test you run a test in two or three minutes. But if you do not need these tests right away, if you are going to finish the churning, all you have to do is to weigh out the sample and put in the oven and go on with the other work. Not many buttermakers ever make a practice of testing their moisture in the butter before they take it from the churn. Of course in that case the time would be a disadvantage with the high-pressure oven.

Mr. Marshall—I would like to ask Mr. Larson what is the remedy for leaky butter?

Mr. Larson—I think leaky butter is some cases would be largely overcome by regulation of the temperature of washing.

Professor Van Norman—How?

Mr. Larson—If you put in your cold water and churn you have chilled it down and that water is not going to work out of it and you are going to have leaky butter, and I believe most of the samples that were criticised were found afterwards had been washed at cold temperature.

Mr. Marshall—What temperature would you recommend for the ripening of the cream?

Mr. Larson—The ripening depends entirely on the length of time you have to ripen. I believe in churning as quickly as possible and if you can churn the same day the milk was taken from the cow it is better. Of course the higher the temperature the quicker it will ripen. About 65 or 70 degrees, if you have a starter gives the best results, 60 to 70. We ripen about 65 usually.

Mr. Tompkins—What are the causes of butter having a fishy flavor?

Mr. Larson—I cannot answer that question. The government has been working for two years on a study of fishy and metallic flavors and they are not able to tell us anything yet. I cannot answer that question.

Mr. Harrington—What is the cause of tallowy flavor?

Mr. Larson—Tallowy flavor comes with tallowy body, in many cases, and the tallowy body may be obtained by the milk itself or by the cream being of that nature; but it is more apt to be due to the cold working and washing. Tallowy butter is usually due to the latter.

Mr. Harrington—Do you think it comes from overheated cream as a rule?

Mr. Larson—No, I believe not. What do you call overheated?

Mr. Harrington—When it comes into the creamery at 75 to 80.

Mr. Larson—Cream that comes in or the milk?

Mr. Harrington—Cream.

Mr. Larson—It may have something to do with the flavor, but it would not necessarily produce the tallowy flavor.

Mr. .... You spoke about churning the same day. Suppose you do not get through until 12 or 1 o'colck, would it be possible to churn that same day?

Mr. Larsen.—Yes. The day would be long but I have done it many times; skimmed from six to one and churned it that same evening. Run it into the ripener and put your starter in and ripen it up and churn it late in the afternoon.

Professor Van Norman—For what reason, advantage or gain?

Mr. Larson—The gain is largely in quality of butter. That is the main thing. The quicker you churn it the better, because the butter keeps better than the cream in any case.

Mr. .... Can you get as good a body as you could if you held it until the next day?

Mr. Larson—You can if you chill it properly before churning, but it must be cooled before churning.

Mr. Cooley—I would like to ask if this tallowy flavor from overheating on the road, that Mr. Harrington speaks of, could be restored by the use of a good starter.

Mr. Larson—It cannot be restored; it can be improved by a starter.

Professor Van Norman—You are refering to hand-separator cream?

Mr. Larson—It can be improved; it cannot be made as good as it was before.

Mr. Harrington—How long should it be left standing before churning?

Mr. Larson—If you have a large amount of good starter and the milk came in fairly ripe, or the cream, of course you could ripen it up in a short time. It does not make any difference about the time, just so you get the right acidity at the time.

Mr. Larson — Hand-separator cream ought to be ripened together.

Mr. Harrington—How long?

Mr. Larson—A few hours is enough. It will all get the same acidity in that time. In churning some sweet and some sour cream the riper would churn perhaps a little sooner, there would be a greater loss in the buttermilk. A few hours is enough. It would not be necessary to keep it 12 hours if we have a good starter.

Professor Van Norman—Mr. President, I just wanted to say to those who do not know Professor Dean, of Canada, that he is a very practical and well-equipped student of the butter making business. Canada is doing some splendid work and I believe that you will all be interested in hearing this this afternoon.

This subject of starters is one that I have been very much interested in. It is one of the most live questions in Pennsylvania creamery business today, and we have three men on the program to discuss it; a number of you here will have some questions and something to say. I believe that our afternoon meeting will be still more interesting than our morning meeting has been.

I hope every man that is not an exhibitor of butter will not fail to hand in his membership so that these reports can be sent to you when published. The last report is out and I hope has reached all of you. We have sent out nearly 3,000 copies. The stenographer is getting down the discussions this morning and it will be reported in the proeedings of the meeting.

The Treasurer is here and he will be glad to receive your subscriptions and give you the badge and a receipt. We will come back here at 1:30 and will have the afternoon.

Adjourned until 1:30 o'clock P. M.

AFTERNOON SESSION

Board of Trade Rooms.
Harrisburg, Pa., Jan. 27, 1909.

The meeting was called to order by the President at 1:30 o'clock p. m.

The President—If you have any questions we would like to have a few minutes' discussion before we start up the afternoon program.

Mr. Calahan—Why is it the butter of Minnesota scores up 100 points, while Pennsylvania is down to about 90?

The President—Mr. Van Dyke has been visiting the western creameries, see if he has an answer for that.

Mr. Van Dyke—Because the quality is better

Professor Van Norman—What makes the quality better?

Mr. Van Dyke—Well, I have visited a good many of the best creameries in Wisconsin and Minnesota and Iowa and I find greater care is taken in the manufacture of butter there than in the average creamery of at East. You go into a western creamery and you have got to talk about butter and butter making as long as you stay there, it seems to be on their mind. They are invested with the idea that each man wants to be the best man. They take pride in the manufacture, they study into the details and I believe there is greater care used, and I believe there is a better feeling between the creamery men and the patron than there is in the east. The creamery man studies to please them and give them value received, and I believe that that is the cause of better butter and that they get better milk than in the home creamery and they use greater care in the manufacturing.

Professor Van Norman—How are we going to bring about those conditions in this state, Mr. Van Dyke?

Mr. Van Dyke—I believe, confidentially, that the greatest thing to bring that about would be state inspection.

At the time of butter scoring I saw perhaps 100 samples of butter scored. When it was very poor, some was very poor, they had a representative go and visit that creamery and help them out of their difficulty. I believe that is what we need in Pennsylvania more than anything else today, State inspection, some one capable of going to explain difficulties where they are putting out the product.

Professor Van Norman—How are we going to get it?

Mr. Van Dyke—I don't know. I am not a politician.

The President—Haven't we any politicians here? Are there any remarks along this line? Has any one got any other question they want to bring up? If they have, let us hear from them.

Mr. Fielden—Do you not think there is something back of the creameries at a place where the milk is produced that ought to be looked after just as much as the creamery that takes clean milk, and that has something to do with it?

The President—How would you remedy that?

Mr. Fielden—In simply that way, have somebody go around and see the creameries.

The President—Have the State do it, or the creamery?

Mr. Fielden—The State, I should say. The State Board of Health of Massachusetts for the last two years has had an inspector out all the time, and it has helped conditions around the dairy farms so that the city of Boston gets very much cleaner milk. If the same thing existed here probably they would get cleaner milk at the creameries whether they are as liberal in their appropriations here or not, I do not know.

Professor Van Norman—The same is true of New York City.

The President—We would like right here to bring up a discussion on that subject with regard to the State furnishing experienced men to go around and visit creameries and dairies in this State and how it can be brought about and the best methods to do it. We would like to have a discussion along those lines and I would like to have you start this up. Mr. Kimble, you start this ball rolling.

Mr. Kimble—Mr. Chairman, I hardly think that there is a creamery man here that would not recognize the good work that has been done by Mr. Van Norman since he has come from the west to our midst. I think he has sown the seed of a great deal of good for the creameries of this State, and I believe that one of the features of creamery work in the State is its lack of uniformity and lack of adherence to the general principles of creamery management that keeps us behind the times. Anybody that travels through the west and goes through the creameries there has met with conditions which we do not realize in this part of the country. The buttermaker in Pennsylvania has to be very careful in the handling of his patrons. As a consequence he receives milk and cream which he otherwise should not do. The buttermakers of the west have gotten around that by having a series of State inspection, not only in creameries but for the daries. They go to creameries and the buttermaker of the west, the moment any cream or milk is offered to him that is not strictly up to the standard, he puts himself in the position, if he buys it, of becoming a criminal under the law, and a patron cannot ask him to buy it. The violator of the law in bringing milk or cream to the creamery is promptly reported to the State authorities and somebody goes to see him to find out what the trouble is. I think it would be a most excellent thing in Pennsylvania, if, under the direction of some competent authority, we could have a system of inspection of our creameries and of creamery work that would be practically secondary to the government inspection which is now going on all over the country. Mr. White, who has charge of the creamery inspection of the United States government, has done a great work all over this country. That work can be well supplemented by the different States themselves and it would seem that the time is ripe for some effort on the part of the creamery men in this State to obtain from the State authorities the right and privilege of having some attention paid to their industry. Now, the dairymen of the State and the creamerymen of the State have some recognition of the importance of their work. They should not get behind the times, but should be fully equal to all privileges that their brothers in the west have. Now, it would seem as though the Pennsylvania State Dairy Union should start the movement to have some State aid in inspecting—well, inspection is a bad word, we do not like the word inspection hardly, a good many of us do not,—but the assistance of the State to provide conditions which will remove any poor condition in the creamery or dairy and with the present agitation in the pure food line and in the handling and care of milk going on before this Legislature, it would seem that some efforts should be made towards having under proper direction and control an instructor or assistant to the creamery men in the manufacture of their products. I believe it is wise for the Pennsylvania State Dairy Union to take this question up and, if necessary, have a committee to see what can be done to have an appropriation or law of some kind passed that would bring about the desired results. Probably Professor Van Norman could help very largely in this respect, his experience in other States giving him the ways and means of doing these things, but it should start with a body and organization of creamery men such as we have here. I am glad this matter has been brought up, because it is something that is progressive and something that we need.

The President—Mr. Marshall, I heartily approve of the gentleman's idea.

The President—Any of the others anything to say along this line?

Mr. Gheenan—I think this gentleman is on the right track, exactly. I have taken this matter up that he has just spoken of with several of our representatives and asked them if they would not use their best endeavors to have an appropriation made that good, intelligent men might be put on the road to circulate among our dairymen, to elevate the cause and further the interests of the farmer in that particular. Not necessarily force him or drive him out of business, but to elevate the business.

I did not expect to say anything, but I have been talking this thing up all forenoon and I thought this would give me an opportunity. If each gentleman will take it up with his representative, wherever he is from, every man interested here in the dairy business will take it up with his representative, you will get an appropriation, and I think the time is ripe for it and every man ought to take hold of it.

Professor Van Norman—I would like to state a word or two possibly in connection with this work. We have a representative here from Ontario who can tell us a little about the work over there. I happened to know that they employ a large number of traveling instructors; Michigan has some, Wisconsin has a number. Minnesota was referred to awhile ago; I know that they have some 16 men who do nothing but visit creameries. They go, not as policemen, but instructors to help those buttermakers, farmers and patrons of those creameries to produce better milk and butter. I believe that we need to put emphasis on the instruction side of this work. We were instrumental, some of you may know, two years ago, in having a bill introduced in the Legislature, providing for inspection, and it was knocked out on the ground that farmers and milk producers did not want police regulations, but instruction how to do those things better. I believe that the thing for our association to do is to push this thing along the instruction side. We have in this State every class of dairying in the United States that is of any importance. We have immense retail markets, a milk shipping business, certified milk, milk dealer and great distributing companies. We have the farm buttermaker, an immense number of them, who sell butter to a retail trade, milking from 10, 30 or 40 cows and delivering that butter within driving distance from where it is made. We have a large number of creameries making butter and selling it direct to the consumer or distributor; this does not go through the hands of so-called middlemen, a condition unlike the west. We have an immense ice cream trade, a growing trade. We have cheese factories, not in large numbers, but we have them. Now it is a gigantic industry with its many branches.

In St. Louis I was at the Exposition four months, and saw all the butter scored. Minnesota buttermakers took from two to three out of the highest five scores every month. Why? Notwithstanding the fact that their entries were something over 300, the average for their 300 was usually higher from month to month than the 10 or 15 from New York, or 10 or 20 from Michigan, or some other small number. When you increase the number you increase the difficulty of getting a high average. Yet, with the large number, they got the high averages. Why? Because their men were educated in the art and science of the buttermaking business, and to me that is one of the best arguments for education, and especially practical education.

It is a fact that the same butter that scores highest at those conventions is the butter that our Philadelphia commission men, New York and Boston commission men are all looking for. The open market fixes the standard of quality in our markets today. The butter that the commission men buy by the thousands of pounds and are willing to pay the price for fixes the standard. It is not what Mrs. Jones, living off on the back street buying a pound of butter, wants. She may know or not know; she may be satisfied with anything. But the man who is in the business and his whole business depends on supplying the kind of butter his hundreds of customers want, that is what fixes our market requirements when we use the term "market requirements."

In this State you have a large number of buttermakers, whose butter never goes into the markets because the grocer takes the butter and pays him market price for it. He thinks he is making as good butter as can be made and yet when he sends the butter to the convention and gets a low score, to use college slang, he is sore. He says, "I can get a cent above 'nearby print' quotations and yet you fellows give us a score of only 90." It is simply because his trade is accustomed to his peculiar butter and likes it, and they are willing to pay him for it. Now, they like the good butter just as well.

If this association does something, I think it should be along the educational line, and it should be in such shape as to benefit the creamery men, the buttermaker, the cheese factory man, the shipping station and the great bulk of our milk producers; and it should be along the line of educational work.

Some States provide for police and educational work. I believe the police side of the work in this State can be taken care of by existing agencies. It is not the police side we need primarily, it is the educational side, and I would like to see this association take the initiative in a movement of that kind, if they see fit.

My judgment as to how it should be done is that you should appoint a committee and let them work it up. But, gentlemen, this will not be done until enough of you want it done and are willing to go into your pockets and support whatever the association or the committee does, and pay the expenses of somebody to look after the proposition. It may mean $100, or $200 or $300 to send that committee down and get a bill in, and look after it and see that it comes up, is properly drawn, and worked up. All those things have got to be thought of and it will not go until you are in earnest enough to do that kind of work. If there were 20 creameries in the State of Pennsylvania willing to put in $10, and individuals to make up the difference, I have no doubt that that thing could be pushed through. Whenever you people are ready to say that you will do that, you will get it. It cannot be done by me or the college asking for it, because we are already asking for more than we will get for our work at the college, but what do you want for your work away from the college?

The President—Are there any others that have anything to say along this line? Let us hear from Professor Dean. What are you doing in your instruction work over there, please?

Professor Dean—We employ about 35 traveling instructors. Of course we make much more cheese than butter in our province, consequently we have only some four or five creamery instructors, the others are instructors for cheesemakers. Now, the prime object of the work of these men is to give instructions, not to act as policemen. I think Professor Van Norman was quite right in emphasizing that phase of the question. In America, and I use that in the wide sense, they think that every man has a right to do just about as he likes, and if you interfere with that inborn right, which every American and every Canadian feels is his, you are apt to push the feathers the wrong way and there will be trouble in the family. Therefore, I think if you were to go to your Legislature,—and judging from what I saw up at your Legislative building, you must have money to burn in this State—if you were to go to your Legislature in the right spirit, backed by the sentiment of the people, which you have here, there ought to be no trouble at all in getting sufficient funds to pay the number of men that would be required to do that work properly. I do not know what it would cost here. It costs us on an average of $1,000 per man. If you would put eight or ten men on the road (I do not know your conditions) that would give you an idea as to how much money would be required.

Now, we have men who do police work. That is, if a farmer tampers with the milk or the creamery man or factory man has an unsanitary place, we have men that act as prosecutors under those conditions, but the regular instructors do not, as a rule, take up that line of work, and I think that the educational side of the dairy question needs emphasis in nearly every way and that is something that the people are willing to pay for. It is surprising how the people of nearly all the States will pay more for education, if it is properly put before them, because they realize education is the great factor in developing the people of the country and its resources.

Therefore, I would say, that our experience has been that the State instructors can do a work which cannot be done by an agricultural college or any of its men at the college, and if you have none of these traveling instructors in your State at the present time, from our own experience, I think you could not spend money more wisely than by having some good men go out among the creamery men and farmers and help them out of difficulty and be a real educational factor in this country.

The President—Is there anything else along this line. We would be glad to entertain a motion if you think a committee should be appointed.

Mr. Knoll—I make a motion that you appoint a committee to take this matter up and to report.

Mr. Gheehan—I will second it.

The President—Have you anything to say in regard to the number of that committee?

Mr. Knoll—I think that ought to be left to the President, as many as he sees fit.

The President—Are you ready for the question?

(The question being put the motion was unanimously agreed to.)

Professor Van Norman—Mr. President, as the Secretary of this Association, I would like to add, that this means business if you want to carry this thing through, and I would like to see the stenographer get the names and addresses of every man who is willing to contribute a little something to the support of that committee. If they are going to do work at all it will mean correspondence, and it will mean somebody going to Harrisburg and a little hotel bill occasionally, and you people who are going to get the benefit of this should supply something to foot the bills. I don't know anybody that is going to do it except yourselves, and if these men give of their time to help push this thing through and take the brunt of the fight, the rest ought to help support it. I think it would not be out of place for those of you, who are willing, to say, "We are willing to help this thing along with our dollars." Then the President has something to go before the committee with if there are 10 or 15. Then your committee has a basis to work on. You can easily enlarge that circle if you have that many to start with.

Mr. ....I think it would be a good idea to find out how many creamery men are here to take hold of it.

Mr. Sharpless—I very much approve of these remarks. A few years ago, I may say, this Association was the birth place of the present oleomargarine law, and some of us worked pretty hard on that question until we got this law passed and we all know what a good effect it had. The committee came to Harrisburg and lobbied, one thing and another, and it was pretty expensive. I approve of the committee being appointed to work on this matter, and I think their expenses ought to be met, a portion, at least.

Mr. Mott—I would like to ask how many creameries are in the State; do you know?

Professor Van Norman—It is pretty hard to tell. We have a list of some 1,100 or 1,200, but somebody tells me every now and then, that the list is not right. In spite of my invitation to tell me where it is not right, they do not send in a list and say, "this one is dead and that one," and help to correct it. It is easy to tear down but hard to build up by giving me information. I think there are 700 or 800 creameries in this State. Many of them are shipping milk that have been formerly classed as creameries. The butter industry in this State is not growing and is not going to grow for a good while, but the milk producing side of it is not getting any less; other branches are growing. I would like to see the hands of as many creamery men as are here that believe in this thing, to the extent of putting something into it, to make it go.

Mr. .... What constitutes a creamery?

Professor Van Norman—The technical definition of creamery is where the milk of two, three, or more herds brought together for the manufacture of butter. If it is the milk from one herd, even though it may be a good deal bigger than the creamery supply, it would count as dairy butter.

I think this movement should not be limited. I say, creamerymen, because we are primarily a creamery meeting. Tomorrow we have the milk producers of the State in co-operation with the Live Stock Breeders, and I think we are simply taking the initiative today and the other side will follow. There are at least 15 or 20, perhaps we had better call names, then this committee will know whom it is to call on.

Mr. Mott—The reason why I asked Professor Van Norman the number of creameries,—of course there are a few buttermakers who would like to give something, some more generous than others. Usually a buttermaker has some influence over the proprietors of the creamery. This is a matter that will come before creamery owners, and it will be for their benefit and there is not one of us but would be able to draw a few dollars out of the Creamery Association. For instance, if we should subscribe as buttermakers and cannot draw it out of the creamery company we will pay it ourselves. It may be possible to make up quite a little sum to help this thing along.

Professor Van Nroman—My idea is buttermakers are not to finance this proposition. It is the creamery's business. The proprietors of the creameries, whether individuals, companies or co-operative assoications. There are a good many managers here, I suppose 20 of them. This committee can be appointed and get busy right off. Here are 10, 15, or 20 men, say we have a dollar a piece to begin this work. Then the committee will have something to send a letter to all the creameries in the State and invite their co-operation, both financially and through their legislators? If the number that are here make that beginning then the committee has got something to work on. If you do not and you wish to go before them you have nothing to begin with.

Mr. .... How much ought this committee to have in hand to get busy?

Professor Van Norman—If they had $50 or $75 in sight that would carry the thing to the point, it seems to me, of knowing what they are going to do and to submit plans to the State at large.

Mr. Kimball—Why not start a subscription now. The company I represent subscribes $10. If necessary to give more, we will give more.

Professor Van Norman—Then, I suggest, Mr. President, that, as Secretary, I take the names of those who wish to subscribe to the fund.

The following subscriptions were received:

Pennsylvania Creamery Company, (and more, if needed)	$10 00
S. T. Edels Sons (paid)	5 00
Moffat Wentworth (paid)	5 00
Walker Ice Cream Company	5 00
Niagara Creamery Company	5 00
Farmers' Elbrook Creamery Co	5 00
New Berlin Creamery Co. ((paid)	5 00
Hartford Dairy Co (paid)	5 00
D. R. Stevens Dairy Co. (paid)	10 00
Spring Brook Creamery Co. (paid)	5 00
W. T. Marshall (paid)	5 00
O. D. Mott	5 00
A. Y. Detweiler	5 00

Professor Van Norman—It is not limited to these amounts. If you want to pay more, or less, it will all help along. We have a record here, if this thing does not pan out we will declare a dividend and reimburse the people in proportion to their contribution.

E. W. Estus	$ 5 00
J. S. Harrington	5 00
H. M. Stokes (paid)	2 00

Professor Van Norman—This will give your committee something to work on and report.

To the late comers we will say we have had a money-raising bee; we are trying to get some money to get an educational bill started for some traveling instructors. If you want to get into the game come on.

Additional Subscriptions

D. H. Meyers (paid)	$ 2 00
A. H. Mathews (paid)	2 00
F. P. Knoll	2 00
B. F. Gabler (paid)	2 00
C. P. Van Dyke	2 00

The President—If there are no others we will take up the program. The first topic is "Factory Butter Making.'

(Mr. M. E. Reeder in the chair.)

The President—Gentlemen, we are open for discussion of this important subject. Any questions will now be heard.

Mr. Knoll—I would like to ask Professor Dean whether he recommends cream without a starter, or with starter.

Professor Dean—I have used both plans. My own preference is without a starter; pasteurize the cream, run it over the cooler directly into the churn and churn as soon as possible. Without the starter I think we make the finest flavor. Some say, "will that butter keep." We find that butter keeps better than butter made from cream in the ordinary way. But you must have the conditions right before you can make that kind of butter. In the average cream you cannot make that kind of butter. Why? Because you cannot get cream delivered in good condition. You must have control over the cream from the time it comes from the

milk and where you can do that I believe you can make the very finest kind of butter.

The President—Any further questions?

Mr. Wivel—Do you get as good results with that kind of cream?

Professor Dean—You mean as to chilling?

Mr. Wivel—Yes.

. Professor Dean—Usually we do, although occasionally we have excessive loss of fat in the buttermilk and we are not able to explain why that should occur. If we have our cream properly cooled and have it a little on the thin side. If we get it cooled down to a temperature of 48 degrees, then we get exhaustive churning. There is that danger you have mentioned, of a high loss of fat in buttermilk. With proper conditions you will get as exhaustive churning as you will where you ripen the cream .

Mr. Marshall—About the keeping part, I don't know whether you mentioned that or not. Does it keep as well as where the cream was not ripened?

Professor Dean—Better.

Professor Van Norman—Better in what way?

Professor Dean—Butter made out of some cream partly ripened and partly sweet, the butter made from the cream churned sweet will hold its flavor better at the end of three months than butter made from the same cream ripened in the usual way. You will understand that in the ripening process, as carried on in the average creamery, as you may have observed, your cream and your milk are more or less exposed in vats, and I have never yet seen the cream that you could not detect the effect of that exposure, and it comes from the bacteria. Those will get into the cream in spite of anything you may do. The more quickly you can churn the cream after it comes from the cow, our experience is, the finer is the flavor of the butter and the better keeping quality and the longer you hold the cream for any purpose whatever, the greater risk you are running of maknig a butter not so good in flavor and lacking what you call keeping quality.

Mr. Thompkins—Do you consider that would be a safe way of doing in many creameries, having no pasteurizer, to churn a cream unpasteurized?

Professor Dean—No, you must follow pasteurization. Where that method is followed you could not do that. Where you take raw cream, unless you had a perfect quality of cream, which is, of course, practically impossible in the creamery. Pasteurization is essential in that method.

The President—Any further questions? It seems to me this is a very important question, "Factory Butter Making," and we ought to learn all we can. We will be glad to hear any further questions.

"Handling Starter," a symporium first by O. D. Mott, Edinburg.

Mr. Mott—We are to have two more papers, and as we are to have a discussion afterwards, I will make this as brief as possible. It is not just exactly the proper subject after listening to Professor Dean, because I am quite a believer in starters myself and he is trying to tell us how to make it without starters, although we will try to have a little discussion. I think half an hour of good hot discussion is better than two or three hours of my standing here talking.

Professor Dean—Lest I should create a false impression I would like to say I would not have you think I do not believe in starters. I certainly believe in them with the conditions under which you work in the average creamery. I am talking about ideal creameries where you have the cream delivered and have complete control of the cream. For the last few years we have been compelled to operate the creamery by gathering the cream and since then we have had to follow the plan our friend has outlined. I would like to correct that impression if I gave you the impression that I do not believe in starters.

Mr. Mott—I was just joking Mr. Dean.

The President—As we have two others to follow on the same subject we will defer the discussion until we have heard from them.

Mr. James Dean, of Towanda—He does not seem to be present. Gentlemen, I have the pleasure of introducing Mr. E. E. Wivel.

Mr. Wivel—For my part I am in favor of using commercial cultures, I am sorry to say I do not use it, never have used it since I left school. I am working for a company that does not have starter and does not believe in cultures, and I would not feel disposed to invest in it myself, so we try to make the best of our conditions and get along without it. When I first went there they were using sour cream and I did for awhile until I changed to the buttermilk. I have had better results because I can detect faults quicker than I could in the cream. This time of the year we are only churning four times a week and I am having a good deal of trouble to keep it in good condition. Sometimes I get some of the best whole milk that I can, and allow that to ferment and use that until I get it back again to where I want it, but altogether it is not very satisfactory to me. I would rather use commercial culture. As I understood this question, Professor Van Norman wanted to know how we handled the starters ourselves. That is what I am trying to tell. When he first asked me about this I supposed I could easily get out of that by saying I did not use any. I knew very well that he knew that and he wanted to know how I did it. I let it sour in the natural way and it produces very good butter then. Some of our head men were buttermakers themselves, dairy buttermakers, and produced a good article and they had control of the product from the time the feed was put into the cow until it was butter. We are getting milk that I do not think any starter would make good. Right along that line I think I would be at the same time very much in favor of an inspector.

The President—The discussion about handling starters is open for any questions that may be put to the speakers in regard to the starter business.

Mr. Marshall—I would like to ask Mr. Mott what culture he uses, and whether in the liquid or powder form?

Mr. Mott—I guess I have used all kinds.

That is, I ran an experiment of my own. Occasionally I used the liquid starter this winter, although I do not think there is any particular difference in them. The liquid starter we cannot keep as long. If you want to get a lot at a time and keep it, it is better to use the powdered form but it takes longer to get started, nearly twice as long as liquid. For our home starters I select milk; I have often taken a dozen cans, the best milk I could get from our patrons, and set them away and take my starter from those dozen cans. I have also gone out among the farmers and milked the cows myself in order to get milk for starter, in a steralized bucket. With a sponge I have washed the flanks so as to keep out as many bacteria as possible. I have done that with very good success. At the same time I have done it in that way and it made a bad starter. You have got to set a few starters and take the best. That is the hardest way, of course, to get them. If you want to take it easy get the commercial cultures, though sometimes I have had as good results with skim milk as I have had with commercial starters, but you must be very careful.

Mr. Thompkins—Several of the speakers this afternoon have spoken of using different materials for their starters. One has spoken of using cream, one buttermilk, one skim-milk. Now, which of these is the one which will give us the best satisfaction and the one that will give us the smallest loss in the buttermilk? We, in the creamery where I am working, are using Cornn Culture, B 41. That gives us good satisfaction, as we set our starter every two days. We use whole milk and it seems to me, from testing and examination as near as we can find, that we have greater loss of butter fat in the buttermilk than is necessary when we use the skim milk. In the northern creameries through Bradford, Tioga and Lycoming, creameries that I have been in, I find several of them using skim milk, some using buttermilk and some no starter at all. The creameries in Dauphin county are using skim milk and whole milk. One man I know of, who has made the highest score at several of the county fairs, and I believe at one time made one of the highest scores at the Dairy Union, had used no starter at all, barring only the natural starter which he has made himself of whole milk. Which is the best mateiral to use for starter, whole milk or cream?

Mr. Mott—Does he mean that for me? Better get Mr. Wivel into some of these discussions. In regard to the buttermilk or cream starters? A very fine flavored sour cream would make a good starter. The same way with buttermilk, but the flavor must be fine in order to make a good starter; where the skim milk starter is not of fine flavor, it does not make a good starter. That is about the way I look at the cream and buttermilk starter. If you are using a buttermilk starter, buttermilk churned this morning for tomorrow's starter, we will put that into the cream tomorrow morning. So we are inoculating the new with the old, and it is getting worse. I would not want to keep it that long. That is the reason why I mentioned the commercial starter.

The reason why you lose so much fat in the buttermilk would be because of the butter fat in the whole milk. If it was not for the loss of butter fat you probably could get a nicer starter by selecting from the fresh morning milk from some farmers than you could by using skim milk.

The President—Mr. Wivel, what is your opinion about this?

Mr. Wivel—I cannot see what difference the starter would have on the churning of the cream unless it would be as Mr. Mott has said, using the whole milk.

Professor Van Norman—What do you use for starter?

Mr. Wivel—I have sort of make shift. I use buttermilk, cream, whole milk, whatever I think is the best.

The President—Are there any further questions as to handling of starters?

Mr. Marshall—I would like to ask one of these gentlemen about what per cent of butter fat should be in buttermilk? What is the general experience?

The President—Mr. Wivel, what is your experience?

Mr. Wivel—The churn manufacturers state how much is to be allowed in the buttermilk for their particular churn. I have never been able to get quite as low as they claim. I generally run three to five-hundredth per cent, sometimes I run over that.

The President—Mr. Mott, what is your experience as to the amount of fat retained in the buttermilk?

Mr. Mott—I did not hear what Mr. Wivel said, it might make a difference in my answer. I should think from four to five-tenths of one per cent would be the result.

Professor Van Norman—He said four or five hundredths, you say four or five-tenths?

Mr. Mott—I may use a different term.

Professor Van Norman—Mr. Cooley, what is yours?

Mr. Cooley—I think two to four-tenths.

Professor Van Norman—Mr. Van Dyke, what is your experience?

Mr. Van Dyke—Five one hundredths to one-tenth.

Mr. Knoll—I do not think that any buttermilk ought to test more that two-tenths. That ought to be the very outside limit unless you get very poor cream that has been pasteurized at high temperature. I do not think it is permissible to get higher than two-tenths. Ordinarily you ought to churn from five one hundredths to ten one-hundrdeths.

Mr. Townsend—I have had it up to six-tenths.

Mr. Yost—I find it is often one-tenth, even less. I think this would emphasize the fact that we need to study the buttermilk problem. I cannot see why it should be more.

Professor Van Norman—Just one point I want to make in the light of things that have been said here today, and the experience of all of us: It has been interesting to me to see that no matter what subject is up, here is Professor Dean, who comes from Canada, and Mr. Van Dyke, who has been out through the west, as have I and a number of others, and when you get right down to it, the men who are making the high-grade, best butter, and doing it right along, are using wonderfully close to the same principles. Some get those results in a little different way than others, but after all they are getting pretty near down to the same principles. Those who are getting high scores are doing the same as the high score fellows in other places, all of which tends to remind me that it does not make any difference who the fellow is if he gets conditions right and understands the principle he gets pretty close to the same general results. It depends upon the man whether he gets those conditions right and controls them. It makes us feel that there is a science that we want to get pretty close to.

Mr. Walter—You have got to get pretty close to the thermometer. If you do not have the cream at the right temperature, you cannot get the butter fat out of it. That has been my experience for over 40 years. Our buttermilk has been analyzed at different times and one-tenth of one per cent was an average of the butter fat left in our buttermilk. Now, in regard to the ripening process. Probably some of you, like my friend Van Norman, think I am an old fogy. I cannot help that if he does, but we started making butter in the old-fashioned way years ago, set it in a small pan and by degrees we worked up to the creamer. Now, in the ripening in our creamers we use buttermilk, adding it each week. We keep the buttermilk about the same acidity and then in ripening our cream we could use the same amount each time in each can to bring it to the same condition. We found that beneficial.

Now, I know some of you think I am an old fogy and I cannot help it. I was persuaded, after reading about it, to get a separator. We got a separator and used it for about six months. For some reason we could not make the same quality of butter that we were furnishing our customers with separator process that we could with the other process, and our customers were complaining. We have a regular customer for our butter, delivered at the door the year round, and my son reported that there had to be something done. I made every study possible to find out where the trouble was and at last we went back to the old Stoddard way of raising the cream and making the butter and we have never had any complaint since. I do not condemn the separator process. Where you are making butter on a large scale, I think it is preferable, but I do contend now that there are some people here that think it is wrong but I do contend you cannot make the same article of butter with the separator process that you can with the old mother way.

Mr. Hershey—I would like to ask the gentleman how clean you get your buttermilk, and how clean is your skim milk when you are working in the old way?

Professor Van Norman—The percentage of fat in it?

Mr. Walter—I can only answer by saying it took on an average of seven quarts of milk to get a pound of butter. It took the same amount of milk as it did in the old system. There was no change made in the cows and, taking the year through, seven quarts of milk would make us a pound of butter, and it did the same with the separator as with the old Stoddard way.

The President—We have an added speaker on the program for this afternoon S. B. Schilling. Prof. Van Norman will introduce the speaker.

Professor Van Norman—I was out in Chicago this fall and I found a very modest man running around there that I know is a very good talker. I tried to get him to promise he would come here, but he would not promise me. Last night I was walking down the street and who should I see walking around aimlessly without seeming to know where he was going, but this modest fellow I was telling you about. When I asked him where he was going he did not seem to know and he was willing to come along. He is here this afternoon and he is the President of the National Dairy Union, the organization that did the fighting in Congress to get the national oleomargarine law that we now have. Mr. Schilling was not president at that time. He was more than the President, he was doing the hard work. In recognition of the hard work he has been doing they made him President. Mr. Schilling is here and I know we will all be glad to hear from him.

Mr. Schilling—Mr. Chairman, and ladies and gentlemen, I am sorry that Mr. Van Norman took so much time to introduce me to you. Now, I will confess that while I appreciate very much indeed the opportunity of standing before you for a little while, I was in hopes that I would not be called up this afternoon at all. I did not come to Pennsylvania to make a speech. I did not come to talk to you, I came here to listen and to learn and I want to say to you that I feel amply repaid already for the trip from Chicago to your State. In the first place I do not live in Chicago. I wish to correct the impression that Mr. Van Norman gives to you and say that I am an Iowa farmer, living in Iowa practically, although I am compelled to stay in Chicago a part of the time. I am just an Iowa Granger. I will confess to you also it was with considerable feelings of pride that I heard our country referred to so many times this afternoon as being so far in advance of you in the east in the production of butter and in the methods of manufacture and creamery industry. I would like to say the right thing to you. If I were before an audience of our own buttermakers at home, I would know exactly what to say to them. But I do not understand your conditions in this country well enough to know how to say the right thing. However, the character of the subjects that you have upon your programme, the character of the questions that have asked, indicate to me that you are alive, very much alive, and that the very same things that are confronting you now in the creamery system and the dairy system in the State of Pennsylvania have confronted us in the west. All I can say is to emphasize something that has been said the country over. In the first place, I was interested this forenoon in the discussion of the fact whether the character of our butter has deteriorated or not? It has not deteriorated with us and I do not see any reason why it should deteriorate with you. There are conditions in our country that confront us today and threaten the dairy industry, the creamery industry, and the output of every buttermaker in Minnesota and other great butter States. I refer to the great Centralizer creamery interests that have taken possession of our country. When I stand before you and say this, that one creamery company controls the entire output of States I am telling you the truth. I am telling you the truth when I say to you that in my own State of Iowa one creamery company practically controls the entire output of over one-half of that State, they control prices. But the advent of the great Centralizer Creamery Company coming into our country and encroaching upon territory of the individually operated creameries, taking everything and anything, has forced us into local co-operative creameries. I am a member of a co-operative farmers' creamery company.

You do not have these conditions in your part of the country that we have. That is the condition today we do not know how to confront. When you consider the increase in the population of our country, which has been about seven per cent a year for the last three years, and that the decrease in the output of the butter product of the United States has been eight per cent a year we are confronting a situation in which the product has fallen far short of consumption and the demand. That is another reason why anything and everything is sold upon the market and why it has sold, and, as Mr. Dean suggested to you awhile ago, referring to the market conditions, which are not as they should be.

I want to emphasize once more something that Professor Dean said, and that is this, that just as far as you confine yourselves to the four walls of your creamery you are in a position that you should not hold. You have got to get out of that idea. The buttermaker of this country has got to be more than a man confined within the walls of his creamery, he has got to be an instructor. The greatest responsibility of today devolves upon the shoulders of the buttermaker. Today our buttermakers are instructors. The farther we go, the more we see the necessity of this, of them equipping themselves to become instructors, not only in the selection and breeding of the cattle, but in the dairy industry. Do you know, in our State of Iowa we will have this winter anywhere from three to five hundred creamery meetings? You were talking about how to reach farmers. We reach them by having creamery meetings. We will have from three to five hundred of these meetings this winter and the patrons of our creameries will get together and will talk over these matters. The buttermakers are in a position to instruct them along lines of better milk, and of this fine product that we have produced. We have creameries upon which the Centralizer has never been able to make inroads and we are making as fine a product as ever. In Delaware County, Iowa, we never have lost a man. We got together as soon as the centralizer threatened and agreed to stand together and to stand by that creamery of ours just as long as we got empty cans back, whether we got a dollar or not, and we are standing by them today. I want to say our product has not depreciated, it is just as fine today as it ever was, and in fact we are improving it instead of letting it go down. This is only one incident, the creamery industry of our State is small as compared to the whole. I wish I could impress upon you buttermakers today, what rests upon you. We have in the first place State meetings, in which we furnish the entire program. Buttermakers' organizations, county organizations, and local organizations. The membership today of our great National Creamery Buttermakers' organization, of which I have the honor to be Secretary and Treasurer, the strongest probably of any national organization in existence, is the outgrowth of these smaller ones, and its membership comes principally from the west.

I want to leave this one great point with you. I was introduced to you as the President of the National Dairy Union. I want to say this, that if you boys in the creamery will just go to work and improve the quality of your product you are carrying out the greatest and most successful warfare against bad conditions that you can possibly do. The poor product of this country has been a help to the sale of oleomargarine. It is simply a question of quality when it comes down to a fight with that product. I want to say this to you, that at the same time that the butter product of the country has decreased eight per cent the output of oleomargarine has increased nearly 30 per cent—28 and a fraction, in the same length of time. Those are the conditions that confront you buttermakers of today.

I do not know when to stop when I am on this interesting subject. You have taken steps today to secure legislation. It is a good measure. I want to endorse everything that has been said along that line, especially what Professor Dean said, that it is not a matter of police regulation. Now, then, you have got to show what the dairy industry amounts to. That is the fundamental principle for success in the whole business. The fact of the matter is that your farmers of the State of Pennsylvania do not realize the possibilities of the dairy cow the way we do in the west. If you could impress upon the farmer the wonderful possibility of that dairy cow, if you could impress upon him the wonderful profit that accrues to the farmer that handles them intelligently you would have no trouble convincing the legislator upon that bill of the necessity of encouraging that industry. We see and understand that. Just for instance, take the cows of the State of Pennsylvania, somebody made the statement during this meeting that they only averaged about 150 pounds apiece. I have heard it since I have been here anyway, somebody either said it here or in my hearing, 150 pounds of butter. Contrast that with the wonderful cow that you have seen in Chicago in one of the dairy shows, that gave 998 pounds of butter fat in a year. One hundred and fifty pounds apiece and one cow that was on exhibition at that National Dairy Show under a test by the College of Agriculture in the State of Wisconsin,—and we have no reason to doubt it or dispute it, I believe it is a fact, because I know the man that made the test,—gave 998 pounds in a year.

The President—That was butter fat?

Professor Van Norman—The average of our State is 160 pounds of butter.

Mr. Schilling—Another thing we are finding out is the amount of money we get from the milk is only a part of the profits from the dairy cow to us Iowa farmers. I listened to a lecture last evening in another hall, in which the speaker told of the loss on your farms today. Do you know it is the dairy cow that has built up our farms in the State of Iowa. They probably were fully as low in their value as yours are and that is what has made them worth today from $100 to $150 an acre. Our cows are doing that and we are getting the most out of them.

I appreciate the opportunity of standing before you for a short time. I appreciate the privilege of coming here and I wish I could say something to buttermakers within the hearing of my voice that would arouse them to a sense of the responsibility that rests upon them. I want to tell you boys that the load is on your shoulders. It is you that has got to educate the dairymen of the State of Pennsylvania from the beginning up. Your State Agricultural Colleges are doing a grand work. I think there never was a finer statement than James H. Hill uttered at the anniversary of his birthday in St. Paul a few weeks ago, when he said if he had the making of the legislation of the country, and the appropriating of the money of this country, instead of the government building three or four battleships a year, he would build one and turn from ten to fifteen millions of dollars into the establishment of agricultural and dairy schools.

I thank you.

The President—We are very glad to have the President of the National Dairy Union with us and appreciate his good counsel and hope it will have a good effect in Pennsylvania.

The next topic is creamery difficulties. Open discussion. Mr. Stokes, what do you know about difficulties? Do you have any?

Mr. Stokes—I hardly know where to begin. I came here today not to talk, but to listen. The more I listen the less I have to talk about. I really do not know what to say. One of the topics interested me, and that was the matter of moisture. That was one of the topics that hung over from last year and I have not gotten square with the moisture problem yet. I am not a bit farther on than I was a year ago at Wilkesbarre. The only thing I am satisfied of now is, to see some one that has such standing as the State College has in the community try to teach us how to maintain sufficient moisture in the butter and yet keep from getting in to jail. They say to us if it is over sixteen per cent we are going to be penned up. Just go so far and no farther. But previous to this time the parties who were talking along this line did not have the standing and I was afraid to take their advice, but since the State College has given us such noble advice I feel as if I ought to be able to make an effort to find how far I ought to go and be careful not to go further. That may be all right in money making, but somehow or other that does not satisfy previous teaching and conscience. I do not think it is a matter of how much moisture we can incorporate into this butter, but how good we can make this butter.

I remember in West Philadelphia a party who was running a fine grocery store used a very dry butter. If you tasted the butter you would not consider it a good butter. But at the same time that groceryman was catering to some of the finest trade in Philadelphia. He could not sell a butter with apparent moisture. Why? Simply because he educated his trade to use the dry butter. I will assure you it is just what your trade wants that you should cater to, and not find out how much you can adulterate your butter. I am not in sympathy with our friend from State College about moisture. He tells us in the western States they are incorporating more moisture in the butter. In the same breath he told you three cars out of five have been condemned, two cars have passed inspection. If that is such good butter then I would like to know how far we are going to try the question out. I was rather amused at what Professor Van Norman said this morning, about calling on the kickers, and passing by the spellbinders. I do not know whether he spoke to the President or not, to have him call on me as one of the kickers. A spellbinder I am not, but I have been blamed as being a kicker about seeing how far we can go without being locked up. I am going to tell you this much, that I am not going to try and the question has not been half as live with me as it has been with some others. There is one thing that attracted my attention: Mr. Van Norman asked the gentleman about washing his butter and he said he thought the butter should be washed to get out the buttermilk. He said, "Why do you want to get the buttermilk out?" Well, now I see the point. You want to put the buttermilk in, salt it and leave the moisture in to get that sixteen per cent. I am in favor of what the brother said there, wash it out. I think that is the proper thing to do. Now they also try to tell us in incorporating this you must wash your butter. If I am wrong I wish you would call me down. They say wash the butter with water several degrees warmer than temperature of your buttermilk. They say that should be done to incorporate moisture. Then the gentleman gets up and asks if you are churning butter at fifty-eight, how are you to wash it then?. Then they tell him to put in crushed ice. I do not think that is right at all. I think that man should have been told to use enough ice to get his cream down to fifty-two or fifty-four. I say it is absolutely wrong to put ice in. You are going to put foreign matter there that you have no right to incorporate into your cream. I claim you want to keep out the ice and be sure that your water is right before you commence to handle it around your butter. I think that is one thing that we should be very careful about.

They speak about the west making good butter. I have no doubt, whatever, but I have been guilty of buying a few tubs of butter once in awhile in winter time. No other creamery man would do that but myself, and I know I have found nine tubs out of ten, I believe I can say forty-nine out of fifty, that was just leaky butter without any grain to it. Now, if anybody found it different please jump up and tell me quick. I don't want to stand up here and make statements that are not correct and have you go around afterwards and say, "that man is wrong." I had one man say to me several years ago, after the discussion was over: "You were wrong." He said words that I did not like at all. He was a man that put it right to me. I told him I didn't know whether I was or not, may be I was. I would much sooner he would have corrected me in the presence of company. But I am going to tell you that that butter was sloppy and leaky, and if they wanted to incorporate any more water into it they had better put it into a can and put a screw top on it. I have never had a pound of that so-called western butter with sixteen per cent of water in, possibly more, may be it was some of the condemned butter. I do not know, may be it was not inspected, but it was wet, leaky and sloppy. If my butter was wet like that in the city of Philadelphia it would necessitate sending it back to rework it. You know that trick is played once in awhile. They write to you and say once in awhile, "Butter not up to the mark, what shall we do with it?" A customer in Baltimore wrote me a letter that he could not use the butter I sent them and he said, "What shall we do with it?" I answered, "Send it back at my expense." A few days afterwards he wired he could not do it, it was sold. When we told him to send it back he did not have it to send back and he made return at full price. If you sold butter as leaky as some of that western goods is I know full well that you would have all the trouble you are looking for among your trade. Do you know, my greatest trouble now is to get my butter dry enough, and to keep from hurting the grain? Of course I believe I have trouble in making butter score ninety-nine. You know when they get hold of it it only scores about ninety-two. When there is a drug on the market and they send it in it does not score quite that much.

There was some discussion about the butter not being as good now as it was years ago. I believe the butter is better. It is simply our taste is improving all the time. I believe the buttermaker today is more intelligent than ever. I believe he is trying harder and harder to make a better grade of butter and I believe he feels incompetency today more than ever. Just as soon as you begin to feel you need a whole lot of study that soon you are making progress. If you think you know it all then I tell you that is the time you are going back. There is one thing I could not reconcile: The gentleman said there is an octopus going all over the State of Iowa and is simply buying up the product and controlling the entire output. That is the Centralizer. Now, if that friend of mine in that creamery country is making better butter than he did years ago, I would like to know how the octopus got that hold of his product. If he is making better butter and gets a better price I would like to know how they can ship 200 more miles. I read the best paper printed, the New York Produce Review. It tells about the Centralizer's grip on this, that and the other thing. That may be the octopus the gentleman spoke about. But I cannot see how the Centralizer can reach out over territory 250 miles and at the same time make a product and put it on the market and make money, with the cream that is brought to them. That is the trouble in the west that makes up for our trouble in the east. When he told us that it was a matter of building up the industry I believe he is right, but when it comes down to the thickly-settled districts it matters not whether east or west, I believe it is the whole milk we want to make the best butter with.

I have got a whole lot to learn. I feel today that I do not know everything. I thought I would keep quiet, and I do hope before tomorrow is here I will find a little something contributed here and there that is going to help me out. I do hope you will teach me how to incorporate sixteen per cent of water into that butter and at the same time sell good, honest goods and then I shall certainly feel glad I was here.

The President—We would like to hear from Mr. Hershey.

Mr. Hershey—I hardly know what to say to this meeting. I have a brother here who has had a great deal more experience than I have, so I will turn it over to him.

Mr. Hershey—The difficulties that we meet are numerous and along different lines. About the hand-separator system, I am glad to say, I have no trouble, because we do not receive cream from hand separators and I hope to see the day far distant that it may be necessary to do so. If I can receive whole milk I will be satisfied and will laud myself as a lucky man to continue in that way.

One of the great things that we have to confront is about cleanliness. An instance I met with was a woman brought us dirty cans. I went to work and cleaned those cans and used a washing powder on them and they looked pretty near as they looked when they came from the shop. She wrote to me and asked what the bill was. That is one of the difficulties we meet in the operation of creameries in this part of the country. We also have another difficulty arising along this line, too many creameries spring up in certain territory where one could be operated at reasonable expense; several increase the expense, which naturally adds to the cost of the product.

Referring to the buttermilk question, I would say my experience is that if I find I can churn so my buttermilk will test from five one-hundredth to one-tenth I

am in several pounds. If I found I was having butter fat in my skim-milk to four and five-tenths, like some made mention, I would run it through the separator and see what I could get out of it after running through the churn. The temperature of the cream would naturally tell me it was churned at too low a temperature. Of course I came to hear some of our longer experienced buttermakers. I refer to Mr. Swope, who has taken some of the prizes at the Exposition several years ago.

Mr. Swope—Talking about difficulties reminded me about this milk coming in. I know that I had milk coming in and the cans really were not fit. That we all know is hard on the quality. One day I went to work and told the person that brought the milk in that those cans need cleaning; I thought they ought to go in with a brush and clean those cans out. The next day, of course, when the team came in they told me that they knew when cans were clean and all this and that. I said, "I know that, too, and I want it understood that the cans ought to be cleaned." From that time on they cleaned the cans and instead of bringing me milk every day sour, they brought in every two days sweet. Then, of course, there are different difficulties a person could speak about, but I think that is about all I want to say.

The President—We would like to hear from some others.

Mr. Larson—Mr. Chairman. I find the overrun very low in this State, not more than twelve per cent in some cases. I have figured the amount of overrun on a good many churnings, several hundred, and I find the overrun usually as low as fourteen and fifteen per cent. That should certainly be increased.

Mr. Stokes—How much?

Mr. Larson—I think we ought to get eighteen per cent.

Mr. Stokes—That would give us how much moisture?

Mr. Larson—Not quite fourteen. I certainly do not believe in high moisture. That is why I emphasized the danger of it. I do not believe in high moisture, I emphasized that, I thought, but I do believe the overrun should be increased, and it can be increased without hurting our butter in the least.

Mr. Stokes—But I understood you to say you had some in the market and the high moisture tests was leaky butter, and those with ten per cent of moisture did not have.

Mr. Larson—That was not it. In speaking of the tests of the butter I made the statement that a large part of the tests of butter that contained over fourteen per cent of moisture was criticised as being leaky, that is true. But it was leaky because they did not use the right methods, while others were getting butter with good body, which proves that it can be done. Some butter makers frequently are getting as much as fourteen per cent and do not know it. If it is right today and right next week it is right to control it and get uniformity day after day.

Professor Van Norman—May I say a word on this topic at this time? The points that Mr. Stokes brought out are worthy of serious consideration, but in the enthusiasm of his oratory he did not quite quote literally some things Mr. Larson said, but if every man in listening to another would make a little allowance and take the spirit of what he said, I do not think we would differ on essentials. He did misquote some of the things that have been said, but he did not mean to do it, I know. As the head of the department at State College, let us set our relation to the dairy interest to do the things it wants to do, or ought to do. If we err in our judgment we are ready to stand corrected. Now, then, in regard to this moisture business, let me state it this way: It has been demonstrated over and over again that a man can put fourteen, or a little more per cent, of moisture in the butter and have a butter that to all intents and purposes is dry and to the eye; it will look dry. Furthermore, I know of butter selling in Philadelphia at sixty cents a pound, and of other butter selling at wholesale at seven cents above quotations. I sat in an office and heard a dealer say, "You may know that our price is always seven cents above market price," and I know furthermore that these people are putting fourteen per cent of moisture into their butter and selling it to that kind of trade.

I am not saying to Mr. Stokes he should go and do that, I am simply saying to him it is done and can be done, and we think we can show you how to do it if you want to do it. If you are selling butter to a trade that wants the kind of butter you are making and does not want this other kind your business is to sell your trade what they want. Let me say to you, if you are satisfied with ten or twelve per cent overrun, when your competitor can get eighteen per cent overrun and four or five or seven cents a pound above your price for it, all right. But when you turn around and complain,—I am not saying you are complaining,—I will put it this way: When a buttermaker who cannot do these things comes around and complains there is no profit in the creamery business and the margin is getting less, then I say he is complaining wrongfully. If you are getting profit enough and are satisfied with your conditions we have nothing further to say, but most people want a reasonable profit, and a goodly portion of these people want all the profit they can get, and it has been shown over and over again that we can enlarge the profit and still make a butter that will please a large portion of the market and still come within the moisture limit. It has been said by some of the best commercial butter judges that butter with fourteen per cent of moisture will spread better than butter with nine or ten per cent, the texture of that butter is better to handle. There may be in Philadelphia, or somewhere else, a class of people that want the dry pastry butter. That is true for the same reason that the boy who was brought up on sour bread, prefers that kind of bread. The mother made that kind of bread and fed it to the children. The mother ate that bread right along, the boys ate the bread, and they thought it was just as good as could be made, and when they went to a neighbor's they complained that the bread was not good because it was not like mother's. It is true, a great many of our Philadelphia consumers like dry butter. They become educated to the dry, pastry butter. If you gave them the other kind right off, of course, they would kick, but if you are convinced that there is a way to incorporate that moisture so as to make a dry butter and gradually increase that per cent of moisture, and at the same time satisfy those customers and increase your dividends, so far as I can see, there is no moral, business or legal reason why you should not do that. If on the other hand you are convinced it cannot be done, you are under no obligations to try to do it. But there are a lot of people turning to us in our capacity as teachers, for helping along these lines. One man whom I have heard say at our different conventions that this could not be done has admitted to me and my representatives that it can be done and that his men have got to do it. Another man got up in one of our meetings and criticised in less kindly fashion than you have done. The attitude of myself on this very point, and on our invitation he came to the college and in three days he was satisfied the statements were within the bounds of reason. We are not attempting to say what you should do, we are simply saying what can be done, and if anyone wants to do things we are willing to help to do them.

The overrun does not hinge entirely on the moisture. It hinges partly on the loss in skimmilk and in the buttermilk. I am sure some of the buttermakers are not testing every churning. They do not know what they are doing. Others do not know what the separators are doing and are wasting cream, here and there little things are passing unnoticed. They are not human if they are not doing that. These are some of the things we are turning our attention to.

Another point leads me to refer to the Centralizers in the west, how can they pay these prices. When they are trying to get as near the legal limit and make a butter between sixteen per cent and fifteen per cent moisture they are getting an overrun that means a cent and a half or a cent and a quarter more a pound for butter. That is why the Centralizer can do these things, because he is getting more out of it. I went to one of the Centralizer factories in Chicago where a girl does nothing except to determine the moisture in every churning. Before a buttermaker can take out a churning he has got to know exactly what he is doing. If he gets sixteen and a quarter per cent he has got to reduce it. Gentlemen, that is just what we have got to do, we have got to figure closer to the absolutely scientific truths, to the fundamental principles. It was the Centralizer, if I miss not my guess, that opened our eyes as to the overrun. It is not so very long ago since "I was from Missouri," and I said, "You will have to show me." With what I happened to know about the dairy business it did not take very much to convince me that there was a little point we had missed and the Centralizer was the first to find it.

Another statement was made about buying butter from the west and that your butter does not come up to the best. Whom do you get butter from when you are short? You are getting from the fellow that has to sell his in the open market. Do you suppose today I could go to Philadelphia and buy the best butter for an occasional shipment? No, sir; every commission man and storage man that has butter to sell has a regular market for the best butter that he can get and we have got to be satisfied with a grade just a little below the best. When there is butter retailed in the city of Philadelphia at sixty cents a pound and men who are looking for more of that kind of butter, then I think some of the rest of us ought to be interested in how to make our butter better so that we can get more for it and help them out.

I have heard this said: "I do not understand why it is, I can get a cent above quotation from my regular customers and yet when I send it to the town market they dock me two cents below and give me a low score." The reason is that the butter that pleases his regular customers because they are used to it, and it will not always please the open market. I beg your indulgence a moment more to emphasize still further this thought, that when there is uniformity of product, even uniformly bad, people get used to it and many times they will be satisfied with it. I have heard of an egg producer who recognized this principle, and so he fed his hens celery and it gave the eggs a little flavor. It was not enough so that you could tell what it was. Then he put the eggs into nice little boxes and labeled them, "If the eggs do not taste like these they are not fresh." When people bought the eggs that did not have the celery taste they thought they were not fresh. You see, they got used to the flavor and the same thing is true about the butter, many customers are satisfied if it comes just alike from day to day. But in making the change, if we are going to make a change, we must not forget that that change must be made gradually and the same is true in regard to sending letters out. You know you can call a man a liar and he will knock you down before you can draw the next breath. On the other hand, you can intimate to him that you have not much faith in what he says and that his statements are not founded upon facts, and he will not say anything about it. Yet have you not questioned his veracity? In the same way you can tell the farmer his milk is not what you want and you will make him mad. You can find some other way to make that complaint and most of them will respond to it.

In regard to scoring, I have not seen the scores of our butter over here, but the butter was scored by a man the government keeps in New York to score butter. Most of our Pennsylvania butter, I think, goes directly from the buttermaker to the distributor, and therefore it does not get criticism and comparison, it does not have to. But Minnesota, Iowa and Nebraska, those western States, are producing more butter than they can possibly consume. Therefore they must seek a market away from home, and when it comes to Philadelphia and New York commission stores and the grocer comes in and wants butter. He looks at the different lots from Iowa, Minnesota, Wisconsin and elsewhere and picks out what he wants. Where does our butter go? To the Smith Grocery Company, in the mountain region; one maker sells him all that he wants, and there is nothing to compare it with, and lots of people have thought the butter they were getting was good butter until they bought some other butter besides it. Mr. Freyhofer scored our butter, some ninety-four, one or two lots ninety-five, and he is the man who scored Minnesota butter and Wisconsin butter, so that our scores will be comparable with western scores. Mr. Freyhofer was asked to score for the simple reason that we happened to know he has demonstrated his ability to score. We had the last time B. D. White, from the United States Dairy Division, for the same reason. I have had the pleasure of seeing some of our low scorers come up, and we have fortunately been able to make some suggestions. We do not know everything, we cannot know everything and do not know it all, but anything we do know is at your service. I believe the essential thing is to understand each other and if we seem to disagree, as the old fellow says, let us argue it out, and we will soon get straightened out and we will be all right. I think in regard to adopting our suggestions, that it is a thing each man must determine for himself, whether his condition justifies the changes which we think possible.

Mr. Schilling—I feel a little explanation probably due to the members. While I do not believe I was misunderstood in my statements in regard to the Centralizer, I believe Professor Van Norman has practically explained why they have been able to do as they have. But that is not the main thing. The reason is that they simply control a vast territory. They go into a place where they want the cream from that district and they will raise the price of the product anywhere from five to ten cents a pound and pay correspondingly low at another place, twenty-five or fifty or one hundred miles away. There is the secret of the whole thing. It is not because there is any danger of their hurting us. We are making a good quality of butter. As I said to you, it is only a small area of our State.

I have just got to say a word on this overrun question: I am a little surprised at the gentleman. To me it is not a step in progress. It is possible I look at it from the farmer's standpoint. I am in the dairy business for a living. If he is honest, and if any farmer is honest, they will look at it in the very same way, they are not in it for glory. I want every dollar I can get out of it, but I want to stay within the pale of the law. I want every dollar that is coming to me, and I do not want to violate the law to get it. If the law allows me to get sixteen per cent moisture in there I want to have it. Further than that, if a buttermaker does not get twenty per cent overrun, he is not going to make it go. It is not a matter of sentiment, it is a matter of dollars and cents. While my position may be wrong, I feel that I am right. I look at it from a business standpoint. Further than that, I feel that it is possible to incorporate it and I feel that we have demonstrated it, this fifteen per cent of moisture can be incorporated and produce a fine quality of butter.

Professsor Van Norman—The Iowa butter is sold in Philadelphia.

Mr. Schilling—Understand our fine butter is contracted for, and as Professor Van Norman said, it does not go on the open market, it is sold under contract. I want to say to you, we are not satisfied with the fourteen per cent of moisture, even if it goes to your Philadelphia market; we want at least eighteen to twenty per cent overrun. It is money in our pockets. Every dollar we get goes into our pockets and when you come to figuring with us farmers we want what is coming our way and we want to get it without violating the law.

I would like to tell a story. May I?

The President—Yes.

Mr. Schilling—Now, I told you I used to be a buttermaker, and I intend to tell this story to you to show the kind of interest that makes a dairy go. I tell you a dairyman has got to be an enthusiastic man. He has got to be earnest and this story I am going to tell you illustrates the enthusiasm necessary to be a good dairyman. It is about a lot of men going into Chicago one day on a railroad train. They were arguing upon the merits of their respective cows. The Jerseyman said: "I have a three-year-old heifer, the first year she was fresh she gave 300 pounds of butter-fat." Soon after that the Holstein man said: "I have a three-year-old heifer; the first year she was fresh she gave 350 pounds of butter-fat." The "Guernsey" man got up and said, "I can beat that, I have a three-year-old heifer who gave 400 pounds of butter-fat the first year she was fresh. At last the "Shorthorned" man, sitting in the back part of the car, got up and said, "Gentlemen, I want to say that I have a three-year-old heifer who gave 450 pounds of butter-fat the first year and she never had a calf in her life, and her mother before her never had a calf." That is the kind of enthusiasm it takes to make a dairyman.

Mr. Stokes—From the standpoint of getting excitement here I feel that my speech has been a success. I sat back here half asleep when the chairman called on me, and if he would have left me alone I would not have done it. I want to tell you now, after this when you do not want to have trouble do not get me to speak. I am sure if you do I will raise all the trouble I know how. It is part of my business. I am glad to see that everything is taken so good-naturedly and good heartedly.

The President—We are very glad we called upon you.

Mr. Mower—I would like to know in what way you can use buttermilk up if you want to use it to the best advantage.

Mr. Marshall—I try to find sale for the most of mine, and do find sale for the greater part of it and get a cent and a half a quart.

Mr. Mower—In what way?

Mr. Marshall—In Philadelphia.

The President—How far do you have to ship it?

Mr. Marshall—About twenty-two miles. We generally churn in the morning and we can ship it from the creamery at about twenty minutes to seven. It gets into Philadelphia about 10 o'clock to 10:30. We do not always have sale for all of it, but we most always have sale for some of it and sometimes all of it.

Mr. Perham in the Chair.

The Chairman—The meeting will please come to order. This is a joint session of the Dairy Union and Breeders' Association. There are a few committees to be appointed. There will be a banquet this evening, and the first thing will be to appoint a committee to solicit for the banquet.

President Norton—I would appoint on this committee Mr. J. F. Lantz, Mr. M. P. Shoemaker, and Mr. Henry Palmer. I think that is all that is necessary.

President Perham—And I will appoint on that committee Professor H. E. Van Norman, Mr. B. F. Gabler, and Mr. G. B. Brown.

The Committee on Resolutions for the Dairy Union was named yesterday, but I will read the names again this morning. This committee consists of T. D. Harman, E. R. Stevens, C. W. Larson, O. D. Mott, and W. D. Marshall.

The first topic on the program this morning is "Market Milk," by C. B. Lane, Acting Chief Dairy Division, United States Department of Agriculture. I don't think Mr. Lane needs any introduction to you, but I have the pleasure of introducing him.

Mr. Lane's address follows:

MARKET MILK

By C. B. Lane, Acting Chief, Dairy Division U. S. Department of Agriculture

Mr. Chairman, Ladies and Gentlemen—We are here today to consider the most important food, the cheapest food, the food that nourishes four-fifths of the babies of this country, the food that has no substitute, the food that has been called God's best gift to man, pure milk.

The problem of providing clean, healthful milk for the ninety million people of this country is occupying the attention of the physician, the chemist, the bacteriologist, the veterinarian and the sanitarian as never before. It is only a few short years since the science of bacteriology has been applied to the milk supply of cities, and since we have really given this subject of milk much serious thought. When I was a boy on the farm, milk was milk, and one farmer's milk was considered just as good as another's. Sometimes it was dirty, but no special attention was paid to it. Now, since we know more about bacteriology, since we know more about the cause of disease, since we know that poisonous toxins develop in dirty milk and produce disease and death, we are giving more attention to these matters.

The question of sanitation, then, is one that is uppermost in the minds of people today. No science has made more rapid progress during the last few years than this. The entire civilized world is throwing itself into the fight against unnecessary and shameful loss of life resulting from insanitary conditions, from impure milk, and from all impure food supplies. It is said today that national intelligence may be known by a given nation's national sanitation. General conditions being the same, the city having the best milk has by far the lowest death rate. One city in our own country reduced the death rate more than one-half through a better milk supply. The city of Copenhagen, Denmark, which once had the reputation of a high death rate, now has one of the lowest in the world, for the same reason.

The demand is made that the dairymen of this country improve their methods, adopt new standards, and meet new demands. Some of the sanitary theories may be overdrawn and some unfair demands may sometimes be made upon producers, but there is one thing certain, that the dairymen of Pennsylvania and of every other State will have to deal with this reform movement, and how he can best do it is the problem we have before us here today. I might say here, that the demand is also made, and rightly, that the customer do his part toward bringing about an improvement in the product which he has on his table daily.

If I were to pass judgment on the producer the credit for having advanced farthest in doing his part in the fight for pure milk. The consumer needs to be educated to take proper care of milk when it reaches his door. Unfortunately, the law stops at the consumer's door, but it follows the producer all the way from the cow to the kitchen. If we should examine conditions today, we should find many a filthy ice-box that was ten times worse than the dairyman's milk house ever thought of being.

The consumer needs to look up the source of his supply and to pay the dairyman a living price when the product is delivered to him in good condition, and not be looking for the cheapest milk he can buy. The average consumer is surprisingly ignorant concerning his milk supply. He not only does not realize the importance of having pure milk, but is ignorant concerning its greater cost. Three-fourths of the milk consumers of this country have never looked up the source of their supplies or seen any account of it. The consumer has often been held up in a favorable light by those who have agitated the cause of better milk, but, as a matter of fact, the milk dealer who rubs up against him, knows that he is usually only concerned with the lowest price at which he can buy milk that is sweet and has lots of cream. Your dairymen all over the country have speculated to their

sorrow on the theory that people will pay extra for milk that is clean. To prove this, if we investigate the milk business in any large city, we shall find that the dirty, careless, price-cutting distributor is still patronized and still holds on to his business. So I say that while some dairymen should be denounced for the methods they pursue, at the same time a demand should be created for better milk on the part of the consumer, and I am convinced that such a demand would be readily supplied. It is true that some progress is being made along this line, for which some credit should be given to the producer and dealer, some to laws and regulations, but very little to the consumer. He is the stumbling block in the work of improvement, and it will be necessary first to educate him, before any very rapid progress can be made. Just as long as the consumer demands cheap milk, just so long he is encouraging uncleanliness, the keeping of diseased cows, the watering of milk and the use of preservatives.

Not Altogether a Question of Higher Price

The fact should not be overlooked that the vital question financially is not so much securing a better price as it is cheaper production. To illustrate: In one county in your neighboring State that was investigated, it was found that more than half of the farmers were getting less than 3,500 pounds of milk a year from their cows, and more than half received less than a dollar for every dollar they spent in food. We need to look at things more and more from a business standpoint. Is it to be wondered at that these men receive only beggarly returns from their cows when only one dairyman out of ten read any paper devoted especially to his life work?

Our Ideals Are Changing

With higher ideals of food products and better knowledge of bacteria and sanitation, our viewpoint is constantly changing. What was considered clean milk five years ago is not considered clean milk at all today.

The commercial value of milk and cream has, until recently, been rated entirely on the basis of the fat and solids they contained; but now we are going a step farther and giving attention to the preparation of market milk as distinct from production and a standard is required not only for its chemical composition, but for dirt, bacteria, pus cells, tsmperature, freedom from disease germs, etc. In other words, cleanliness is considered a commercial quality and we are depending more and more upon the laboratory to assist in regulating the quality of the milk supply. This is as it should be. We have never given attention enough to this matter.

Incentive to Produce Better Milk

I saw this statement in a recent dairy paper—"No encouragement is offered the sanitary dairyman except that branch known as 'certified milk' where extremes of expense have often made the product prohibitive." I cannot entirely agree with this for there is beginning to be a decided trend toward better prices for better milk. For example: One large milk company in a certain State notified the farmers that 10 cents per can would be paid over and above the market price to all dairies scoring more than 75 per cent. by the dairy inspector, and to all dairies whose premises scored less than 60 per cent., a reduction would be made; and further, that no milk would be accepted from farmers whose premises scored less than 50 per cent. Now nearly all the leading companies have a clause in their contracts concerning the sanitary condition of the dairies. The New York City Board fo Health now issues a certificate properly engraved, setting forth the high rating and excellence of farms scoring 90 or above. These certificates have aided dairymen to secure better prices for their product in hotels and private residences and the consumer has the satisfaction of knowing that the milk is produced exclusively on premises where proper attention is paid to sanitation and the health of the animals.

A Few Points in Milk Production

The dairy industry, as far as it relates to the production of market milk, is rapidly undergoing a revolution and the changes demanded by the Boards of Health must necessarily increase the cost of production somewhat, but not to the extent that we are sometimes led to believe. Many of the careless methods which have been sanctioned in the past must go, and I think we are now agreed that they should. I believe the majority of dairymen are willing to do their part, but they do not want to be insulted into doing it, and you cannot blame them. What then is required from the present day standpoint? In a few words, the demand is for clean, healthy cows, well lighted, well ventilated and clean, airy stables, tight, sound floors, clean, healthy attendants, clean utensils, prompt removal and cooling of the milk in a proper room used exclusively for the purpose and storage at a temperature below 60 degrees.

I cannot recommend too strongly the use of the small-top milk pail in eliminating dirt and bacteria. In one instance where a study was made of this point, it was found that where the ordinary open pail was used, the bacteria count was 3,439,000 per cubic centimeter, as compared with 6,600 with the small top pail.

Again, the use of the damp cloth in wiping the udders and flanks of the cow before milking, is very important in reducing the bacteria count. Stocking found that where this was practiced in one instance, the number of bacteria in the milk was 716 per cubic centimetre, as compared with 7,058 per cubic centimeter where the moist cloth was not used.

I would like to call attention, also, to the question of straining milk. I am satisfied that the dairymen are giving altogether too much attention to finding a strainer that will remove the dirt and too little attention to proper care and cleanliness in keeping the dirt out. In most instances when the milk passes through the strainer, nine-tenths of the bacteria and all the bad flavors in the milk pass through also and all that remains is some coarse matter that can do no harm.

Dairymen should learn that milk once dirty can never be cleansed by any process.

Production of Clean Milk Not a Hardship

To illustrate: One dairyman had a bacteria count of 1,200,000, when sampled three hours after milking. Considerable time was spent in studying out a method of improvement which might be adopted at a small cost. Finally, a few more windows were put in, some canvas ventilation was used, a few coats of whitewash were applied, the milk was carefully cooled, and then the bacterial count of this milk came down to 100,000 per cubic centimeter at the same age. The cost had been about two dollars, and now the milk was declared good enough for anybody to drink. From this illustration we are led to believe that the production of clean milk is not altogether a question of greater cost, but, rather a habit.

Responsibility of the Health Officer

Laws must always be in force for the willful lawbreaker, the careless and the ignorant, and the public should mave a right to protect itself from disease or any impure product. Some of our city health departments have perhaps been a little too radical and have not always met the producer half way. The Health Officer shoul have patience and should endeavor to point out to the dairyman his faults and give him a fair chance to improve before condemning him. Co-operating is a good deal better than clubbing. Of course, it is understood that the persistently dirty dairyman must be dealt with with a firm hand, but the point I want to emphasize is, that the majority of dairymen are not wilfully dirty and that they are willing to do anything reasonable. But they need to be condemned less, and assisted and instructed and encouraged more. If the inspector could be looked upon as an instructor rather than as an official inspector on police duty, many of the difficulties between Health Boards and dairymen would disappear. Such instruction should be given right at the dairy farm, with the dairyman on the spot, and it should be given by capable and practical men. The dairyman has often had good reason for objecting to inspection. For example: An inspection force was appointed in a Western city, recently, which consisted of an engineer, a detective, a solicitor, a machinist, and an ex-policeman—a good example of what poor politics is doing in some of our large cities.

The Score Card System of Inspection

The score card system of dairy inspection has proved very valuable to Health Officers in keeping records of all dairies in convenient form for ready reference; in keeping tab on the work of dairy inspectors, and as a basis for issuing permits. The following diagram shows how the City of Richmond, Virginia, raised the average score of dairy farms from 41.5 to 72.0 (73.5) in twelve months through the score card system.

(From Report of E. C. Levy, Health Officer.)

Advantages to the Inspector

The score-card system shows the inspector what to look for, making it impossible to overlook any point of importance. The ratings of the dairies are kept as a permanent record by this system, and comparisons can readily be made from one inspection to another and improvements noted. It aids the inspector in making explanations to the dairyman, and he becomes an instructor and friend, rather than an officer whose visits are to be dreaded.

Advantages to the Dairyman

The score-card system points out details in the production and handling of milk, this making it clear where the defects are and what ideal conditions should be. It encourages confidence among dairymen, as they all feel that they are being treated alike. It also leads to greater profits, as more attention is given to details, which is an important factor in any business.

Publicity Aids in Making Improvements

The publication of the results of inspection has a strong moral effect. Most dairymen have pride enough not to want to be at the bottom of the list, and if their record is published, there is a constant incentive for them to come up higher. The following shows the method of publishing scores in one city, as well as the condition of the dairies :

Dairy Scores, 1906

Dairyman.	Cows.	Stab les.	Milk House.	Ratings Milking.	Handling of Milk.	Total.
(Perfect Score)	20	25				
No. 1	*18	21	20	15	20	100
No. 2	*19	22	20	15	20	94
No. 3	12	19	20	12	19	92
No. 4	10	21	20	12	19	82
No. 5	11	19	19	13	19	82
No. 6	11	19½	18	12	19	79½
No: 7	10	16	18	12	18	78
No. 8	11	19	20	12	19	77
No. 9	9	,20	19	12	15	76
No. 10	9	19	19	8	19	75
No. 11	11	18	17	11	18	74
No. 12	11	11	13	12	17	71
No. 13	11	14	16	12	18	68
No. 14	9	11½	16	9	15½	66
No. 15	11	13	15	10	15	60
No. 16	9	19	13	10	11	58
No. 17	8	10	4	12	14	58
No. 18	10	8	4	12	14	48
No. 19	8	10	6	9	12	45
No. 20	9	13	4	10	12	44
No. 21	6	8	4	8	9	43
No. 22	5	2	4	9	12	39
			6	5	15	33

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*These cattle are tuberculin tested.

Inspectors' Report of a Bad Dairy

Mr. A.—This is one of the most unsatisfactory supplies coming into town. The quality of the milk has been very poor, and the bacterial count high throughout the year. As will be noticed from the "dairy scores," Mr. A. has a very poor stable; he bottles the milk in the basement of his house, and he has no sterilizing apparatus.

Inspectors' Report of a Good Dairy

Mr. B.—This supply is well known to be first-class in every respect. Mr. B. has an up-to-date dairy with modern equipment, and his cattle are regularly attended by a veterinarian. During the past year one herd has been tuberculin tested, and his other herd is to be tested, which makes his milk all the more desirable.

What kind of a record have you?

Are there any questions?

A Member—I want to tell you the state of things in our country. A dairy inspector, sent out by the Board of Health, came down and looked at some cattle, and said: "Well, things are about as good as I expect to find them." I asked him, "What do you know about milk?" He said, "Nothing; I never milked a cow, and know nothing about them." He was a physician by profession. Now talk about milk inspection, when they send out that kind of men!

Mr. Lane—You are exactly right. In the Western city I spoke of, they sent out an engineer, a detective, a solicitor, a machinist, and an ex-policeman as inspectors. Now, that is not right. A milk producer can reasonably expect that the inspector will be able to point out deficiencies, and help him improve all along the line, and he must not expect that it has all got to be done in a minute. He must give the man time. Some of the dairymen who have been in the business thirty, forty or fifty years, do not understand why the methods which have been "O. K.'d" in the past by the Health Officers have suddenly been condemned. They do not understand it, and, as a fact, I think they should have practical instructions from the dairy inspector.

Mr. Sharpless—I wish you would tell us how long it would take the ordinary dairyman to count eighty or ninety million bacteria.

Mr. Lane—He is not expected to count them; he is expected to keep them out of his milk.

Mr. Van Norman—Don't you think a good rule to reduce the bacteria count is to discard the fore milk?

Mr. Lane—Well, there is some question about that; some cows will have a good many more bacteria in their udders than others; there may be more conditions that produce them; in certified milk plants, where the bacteria count has to be kept very low, they may do this, but they are also careful to wash the udders and flanks of the cows, and use the small-top pails. Up in Newberg, New York, where they have had a count of 183 bacteria for four months, the udders are washed, and everything is kept perfectly clean, but they do not discard the foremilk any more. Now, in the average dairy, where everything is not kept so perfectly clean, it may be well to discard it.

Mr. Van Norman—My own experience has been, with a herd of 90 cows, where it would be impracticable to wash the udders and flanks of the cows that discarding the foremilk reduced the bacteria from 15,000,000 to from 4,000 to 7,000.

Mr. Conklin—What kind of men are making the inspection of dairies? What kind of men are doing it in the thousand dairies in the neighborhood of Washington?

Mr. Lane—If you refer to the State of Washington, they have five inspectors there who are the dairymen connected with the Board of Health, and it is their business to see that the dairies contain no diseased animals so far as can be discovered by a physical examination. In this case the inspectors are all cattlemen, but that is not so in most other cases.

Mr. Dodge—You spoke of certain cows who derive bacteria from contact. What is the cause of that?

Mr. Lane—It is due to some abnormal condition. A cow may have garget, or some abnormal inflammation, and never entirely recover from it, and it has been discovered that in this condition the cow may for several months have a large bacterial count.

Mr. Dodge—Milk coming from a healthy cow, under sanitary conditions, is pure?

Mr. Lane—Yes, sir; under ordinary conditions, absolutely pure.

Mr. Van Norman—You say the farmer must do certain things; now, we know that some farmers are not in condition to produce what the inspectors call "clean milk." Why not make the bacteria the test? If his milk comes up to a certain standard, why not give the farmer the benefit of it? Why is it that you do not make the milk produced by the farmer the test, instead of the conditions under which it is produced?

Mr. Lane—You are perfectly right in assuming that the dairymen have had a hard condition to meet in turning out a good product, but it is the same thing in the commercial world, and in everything else that is undertaken.

President Perham—I want to ask what inducement the Boards of Health, as a rule, are offering these dairymen; what advance in price, if any, for a good, clean wholesome product? Will they pay any more for it than for the common, ordinary milk?

Mr. Lane—Of course, it is not the business of the Board of Health to fix prices; it is their business to create a demand for good, wholesome milk, and then the farmer has to fix the price. Of course, they do some work along that line, but it is hardly the work of the Board of Health to do that.

President Perham—Now, in the community where I live, our milk is all shipped to New York State, and the consumers who are most particular about it are those who pay the least, while those who are willing to take anything that comes along are willing to pay 10 cents per hundred-weight more.

Mr. Lane—The man who refuses to pay

the price of good milk should not be able to get it. We are slowly getting to the point where the dealer will have to pay more money for better milk. I have mentioned several instances where the dealer has put a premium on better milk as an inducement to go up higher.

President Perham—But it looks to me as though the city that wants pure milk would offer the farmer some inducement to make it.

Mr. Lane—It is slowly coming to that.

Dr. Conard—I am very much interested in Mr. Lane's account of the work of the City of Richmond; it coincides with some work done in this state, in a limited district, largely through the work of the State Live Stock Sanitary Board. It has been operative only during this last year, and in cities where its provisions have been enforced they have been very fortunate, indeed. The State Live Stock Sanitary Board co-operates with the local Board of Health, in seeing that the herds are free from disease. In four cities of the Western part of the State they employ a local Commissioner, and are getting excellent results.

Mr. Lane—I hope you get the right kind of inspectors.

Dr. Conard—That is very important, and has been done so far as is possible. A good thing can be spoiled by one poor man. We have tried to instruct the dairyman, rather than to criticise him; the inspector has gone over the ground and taken into consideration the means of the man, and then outlined a plan by which he could improve his conditions, and still keep within the limits of his means. I know dairies need just the things mentioned—better ventilation, more light, white-washed walls, and more sanitary milking into small-top pails. All these things have been kept in mind, and our dairymen have been instructed, rather than criticised, and when the instructor left the man did not feel that he had been even instructed, but that he had been educated, and that is what we want, inspectors who will educate the man whose methods are improper. It is a matter of education only, and I want to say that the people who have been instructed have received it with open arms. They say, "We are glad to have you come back at any time"; that is the way the instruction is received.

Mr. Lane—That is the right idea.

A Member—Coming back to the question of diseased udder, with several cows in the herd, it seems to me that it increases the bacteria in the entire herd. But if you do not find any diseased condition, would you think that the stripping of the fore milk would keep the bacteria down? If the cow were diseased you would find pus there, would you not?

Mr. Lane—Of course, if the udders are not thoroughly washed, throwing out two or three streams of fore milk will throw out a large part of the bacteria, but if the cows are kept thoroughly clean this need not be done.

A Member—But in a large herd, it would keep five or six men busy washing the herd, and you would hardly care to go to that expense.

Mr. Lane—You could hardly afford to go to that expense, either.

President Norton—If there are any more questions, we will be glad to hear them.

Mr. Van Norman—I think in regard to the testing for bacteria, you are beginning at the wrong end. What you want is clean milk, and the conditions under which it is produced do not matter. This way, the conditions under which it is produced, rather than the milk itself, is made the test.

Constitution of Pennsylvania Dairy Union.

Article 1.

The name of this organization shall be The Pennsylvania Dairy Union.

Article 2.

It shall be the object of this organization to promote, protect, encourage, and develop the dairy interest of the Commonwealth by every means within its power.

Article 3.

Any person, firm or agricultural organization interested in dairying may become an active member for the calendar year on payment of one dollar ($1.00), or may become a member for life on payment of ten dollars ($10.00.)

Associate members: Any agricultural organization that is an active member of the Pennsylvania Dairy Union may have its members listed as Associate members for the calendar year on payment of twenty-five cents (25) for each such member. Associate members shall not hold office or vote.

Any one rendering this organization noteworthy service, may by a unanimous vote at any regular meeting, be chosen an honorary member. Honorary members need pay no dues, they may participate in business, but not vote nor hold office.

Article 4.

The officers of this organization shall consist of a president, one vice president, a secretary, a treasurer, and six directors, all of whom shall be elected by ballot at the annual meeting, and shall hold office for one year. The president, secretary and treasurer, together with the directors elected, shall constitute a board of directors.

Article 5.

1. The president, vice president, secretary and treasurer shall perform the duties ordinarily appertaining to those offices.

2. Between the meetings of the Union, the board of directors shall have the general management and control of the property and affairs of the organization, subject to the Constitution and By-Laws.

3. Four members of the board of directors shall constitute a quorum to do business.

4. The board of directors shall organize by the choice of a chairman, and a secretary, and may adopt such rules and regulations as shall seem desirable for its government and may appoint such committees from its own members or from the general membership of the Union as it shall consider desirable.

5. It shall be its further duty to decide the location and date of the annual meeting of the organization, and to make all necessary arrangements therefor.

6. No expenditure of the funds of the organization shall be made except by a majority vote at a meeting of the Union, or as authorized by the board of directors, and all bills shall be approved by the chairman of said board, before their payment by the treasurer.

7. The board of directors shall serve at each meeting as a committee on resolutions.

Article 6.

Meetings shall be called by the president at such time and place as may be designated by the board of directors. There shall be at least one meeting of the Union each year.

Article 7.

At any regularly called meeting, fifteen members shall constitute a quorum for the transaction of business, but a smaller number, not less than eight, shall have the power to adjourn to another date.

Article 8.

This Constitution may be amended at any annual meeting by a two-thirds vote of active members present, provided notice of such amendment shall have been given in the call for the meeting, issued at least a month previous thereto.

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*As amended January 16, 1908.

OFFICERS

President, W. E. Perham	Niagara
Vice President, J. R. Reist	Mount Joy
Secretary, H. E. Van Norman	State College
Treasurer, W. D. Marshall	Lyndell

DIRECTORS

M. P. Shoemaker	Greensburg
E. E. Jones	Harford
H. B. Richards	Easton
G. M. Carpenter	Wilkesbarre
D. R. Stephens	Sayre
Secretary, P. P. Gheen	Willow Grove
Representative on Executive Committee of Allied Agricultural Organization, L. B. Henson	Coatesville

SPECIAL LEGISLATIVE COMMITTEE

E. E. Jones, Harford. D. R. Stephens, Sayre. H. M. Stokes, Hanover.

CERTIFIED MILK PRODUCERS' SECTION

Chairman, H. B. Richards	Easton
Secretary, P. P. Geehn	Willow Grove
Bryn Clover Dairy	Malvern
Harvest Home Farm	Glenloch
F. E. Moore	Alfred
M. W. Palmer	Kingsley
Wawa Dairies	Wawa
Willow Brook Farm	Willow Grove

HARRISBURG, JAN. 26-29, 1909.

EXHIBITS AND SCORES.

CREAMERY BUTTER

W. H. McGranahan, Pittsburg	De Laval	Worcester	Hansen's	92
O. Blish, McCall's Ferry	De Laval	Worcester	W. R.	90.5
*L. H. Cooley, Burington	De Laval	Diamond	Hansen's	94.5
C. Y. Detweiler, Bellville	U. S.	Worcester	W. R.	90

L. W. Keir, Nichols, N. Y.	De Laval	Colonial	Hansen's	91
J. C. Martin, Collamer	D "	Worcester	W. R.	93.5
A. H. Mathews, Newport	"	Ash	W. R.	90.5
Thomas Niering, Wopwallopen	"	Worcester	W. R.	92.5
*O. D. Mott, Edinburg	"	Worcester	W. R.	94.5
H. W. Saxton, Granville Summit	"	Worcester	W. R.	91
E. C. Wivel, Fulton House	"	Worcester	....	91
R. E. Williams, Mifflinburg	......	......	......	92.0
D. H. Meyers, Mifflinburg	De Laval	Colonial	W. R.	90.0
H. K. Stively, Quakerstown	"	Worcester	Hansen's	93
Guernsey Creamer, Guernsey	Sharples	Worcester	W. R.	91
New Era Creamery, New Era	De Laval	Worcester	W. R.	91
D. H. Davis, Meshoppen	"	Worcester	W. R.	92.5
S. F. Yost, Meyerstown	......	......	......	94
F. W. Reynolds, Mainsburg	......	......	......	91
J. W. Waite, Smethport	Sharples	Worcester	W. R.	90.5

DAIRY BUTTER

*J. A. Herr, Lancaster	U. S.	Worcester	Hansen's	93
E. E. Callahan, Wellsboro	....	....	W. R.	90
J. E. Dean, New Castle	......	......	......	91
R. J. Weld, Sugar Grove	De Laval	Colonial	W. R.	91.5
Austin Leonard, Troy	"	Worcester	Hansen's	91.5
B. F. Gabler, Greensboro	"	Ash	W. R.	92.0

*Silver cup won by highest score in each class.

B. F. Gabler, Greensboro	"	Ash	W. R.	92.0

CERTIFIED MILK

Willow Brook Farm, Willow Grove	96.5
M. W. Palmer, Kingsley	95.5
Bryn Clover Dairy, Malvern	91.0

MARKET MILK

Pencoyd Farm, Bala	97
M. P. Shoemaker Bros., Greensburg	95
Penshurst Farm, Narberth	92
E. S. Risser, Palmyra	90
Meadow Brook Farm, Jeannette	93
F. M. Fasset, Canton	91

Note—WR—Wells-Richardson.

Joint Meeting of the Penna. Live Stock Breeders' and the Penna. Dairy Union

Proceedings of the Live Stock Breeders' Association

Breeders' Assocnation.

President Norton—If there are no further questions, I wish to appoint the following committees for the Breeders' Association:

Auditing Committee—Joshua Sharpless and James Blair.

Nominating Committee—W. G. Powell, M. N. Clark, and R. L. Munce.

Committee on Resolutions—Prof. H. E. Van Norman, Dr. Carl W. Gay, and J. E. Dodge.

We will have a banquet tonight at the Lochiel Hotel, which I trust the members of the Breeders' Association and the Dairy Union will bear in mind. We want you all to take an interest in it, and to be on hand.

The next thing on the program will be a talk on "Profit in Market Hogs," by J. E. Dodge. I have the pleasure of introducing to you Mr. Dodge.

PROFIT IN MARKET HOGS

By J. E. Dodge, Narberth, Pa.

Ladies and Gentlemen: I fear you may be disappointed in what I will say, as I am not a public speaker, having devoted too much time to feeding, breeding, and handling the hog and dairy cow to increase their productiveness to practice speaking. Profit in market hogs depends on so many things that I hesitate to tell you what little I know, as many here probably consider the profit in pork-making as a delusion and a snare, especially with eight-cent hogs and seventy-five-cent corn. If I were to say in a few words how to make a profit from market hogs, I would say: better hogs, cheaper feed, and better care. Many hogs and some breeders have been nearly ruined by close confinement and excessive corn feeding. To make a profit we must have first-class hogs, and warm, comfortable quarters for them; neither need be expensive. I prefer the separate lot and small portable pen. These individual houses cost but little, are comfortable, and give the sows and pigs room enough for plenty of exercise, and the lots can be utilized in turn, to grow clover, rape and other green feed. By having a separate place to fatten the hogs in you have ideal conditions—the exercise and green feed for developing bone, muscle and frame, and the less roomy pen where the hog will eat, lie down and grow fat.

The day of the slow-maturing hog that took two years to grow and fatten is past. In his place is the early maturing hog, that develops young and lays on fat at an early age; one that will go to the butcher at six to nine months, weighing 200 to 300 pounds, for the Philadelphia market. An even smaller hog, weighing 140 to 175 pounds, tops the market. These can be turned off at five or six months. To get the right kind of a hog, if you do not want to breed pure-breds (although I think this is advisable, as good, registered stock can be secured at reasonable prices) we should use a boar from one of the registered breeds, crossing him on the native or scrub sow. Select a boar from the breed you consider comes the nearest to fulfilling the requirements of a market hog, and stick to boars of that breed; do not use a Berkshire this year, a Poland-China next, and some other breed next, or you will soon have the worst kind of scrubs. Do not make the mistake of keeping young sows each year for breeders. When you secure good ones keep them as long as they will produce good litters. Breeding constantly from immature animals will lower the vitality, and lessen the feeding qualities. When you have secured the proper type of hogs, if you give them good care, shade, clean sleeping quarters, clean water in the summer, and clean, dry sleeping quarters in the winter, you will find that there is none of our domestic animals that will pay better for care and feed than the hog. Feeding all corn to hogs is not the way to make pork raising profitable. There is on nearly every farm some field or fields that are practically useless; give them over to the hog, and see how soon he will clean them up and fertilize them, so good crops can be grown. How many utilize the garbage from the house, the waste from the garden, orchard, etc.? And yet here is a valuable asset in pig feeding. This will keep one or more brood sows, and go quite a long way towards raising a litter.

A good brood sow will raise two litters a year; the summer litter can be grown largely on grass, rape, cabbage, and other green feed. The winter litter on clover, alfalfa, and garbage. Supplement these rations with a little corn-meal, middlings, tankage, skim milk, or cracklings. These feeds will grow a large, strong frame, and as the pig reaches the fattening age, increase the corn-meal and he will quickly be ready for market, and you will have utilized many things that would otherwise go to waste, and made some profit.

Pennsylvania farmers need to watch with care the fertility of the soil, as on this depends their success as farmers. There is no better way to increase the fertility than feeding the crops to live stock. We can grow as much corn and other grains per acre as any state in the Union, and if every farmer will feed his crops to hogs and other live stock, buying, as needed, other feeds, he will find a high-priced market for his grains, and each year increase the fertility of the soil, and so grow bigger crops. I know that in the West they give over whole fields of grass and corn to the hogs, and in the South, fields of corn, peas, and other crops, to save labor of harvesting; but that method seems wasteful to us here.

I would like to see on every farm in Pennsylvania, one or more brood sows kept; and if the farmers will do this they will, I am sure, bless the hog, as a scavenger and a money-maker.

President Norton—Any questions?

Mr. Rodgers—I would like to ask if you like linseed oil to feed them?

Mr. Dodge—Yes, sir.

A Member—Would you have a sow produce her first litter before she is a year old?

Mr. Dodge—As I said before, beyond doubt breeding from too young sows will in time produce inferior hogs, lacking constitution. You will find the second, third, or fourth litter stronger.

A Member—I don't know about that; I have seen sows less than a year old produce as good litters the first time as those that came after. Some of them seem to possess more vitality than those three or four years old.

Mr. Dodge—Well, a sow well grown will naturally mature at one year. They will grow 75 per cent to 90 per cent of their weight at the end of the year.

Mr. Clark—There has been a question raised in reference to the high price of feed. Now, is it not a fact that there is more profit in feeding them during the summer on grass?

Mr. Dodge—There is profit in that, and I prefer it to anything else.

A Member—How about silage? Have you ever fed that?

Mr. Dodge—I have never fed that; the hog is not the same as the cow, and I do not consider silage a profitable food.

Mrs. Betts—I would like to ask these men who are dealing in stock, if they do not find in breeding pure-bred stock that the introduction of a new element is necessary occasionally? In breeding from generation to generation along a certain line, is not a standpoint sometimes reached where in order to keep the stock at its best it is necessary to introduce new blood?

Mr. Dodge—In breeding from generation to generation along certain lines—I think this question is well illustrated in the Jersey cow. In the little Isle of Jersey, five miles wide by ten miles long, they have bred for five hundred years along the same line, and have simply increased their standard until the Jersey cow stands today for the highest type of excellence.

A Member—Do you recommend alfalfa or clover as a winter feed, and, if so, how would you prepare it for the young hog?

Mr. Dodge—In the winter I would cut it up and steam it, and you will be surprised at the amount of clover and alfalfa hay they will eat. I have tried for several years bedding our hogs on clover hay, and at the end of three or four days there is not a bit left. We get better results by it.

A Member—What do you feed?

Mr. Dodge—Cornmeal, middlings, bran, and a little tankage.

Mr. Herr—What average increase in weight can you reasonably expect from young hogs on a ration of this kind?

Mr. Dodge—Well, I don't know that I can tell you, but I like to have them weigh 300 pounds at from seven to nine months.

Mr. Rodgers—Clean meat?

Mr. Dodge—Live hog, or better than that; but that is a fair hog.

A Member—How long do you consider it profitable to feed skim milk to hogs?

Mr. Dodge—We feed it as long as we find it profitable; that is a question that the condition of the hog must decide.

A Member—What is it worth?

Mr. Dodge—Skim milk mixed with corn meal is good for fattening hogs.

Mr. Rodgers—Can you tell the difference in the meat of certain breeds of hogs?

Mr. Dodge—I don't think I could, but the head buyer for Swift in Chicago says there is one breed that has more bacon to it.

Mr. Bayard—What breed is that?

Mr. Dodge—The Berkshire.

Mr. Taylor—I would like to ask which is considered the most profitable hog feed —meal or hominy?

Mr. Dodge—I don't know that I can answer that question. It is any material you can grow yourself. If you can sell your corn to your own live stock, you not only make a good market for your corn, but you fertilize the farm as well.

President Norton—In answer to Mr. Taylor I would say that I have fed hundreds of tons of hominy, and it is a good feed, but I prefer linseed meal as a fattener.

Mr. Taylor—I have also fed meal, but my neighbors have been feeding hominy.

A Member—What weight do you consider it most profitable to sell your hogs —150 or 175 pounds?

Mr. Dodge—150 pounds, when the market is favorable to that weight; the nearer you can get to the market, the better.

Mr. Bayard—Why is it that such a large proportion of our hog receipts consists of red hogs?

Mr. Dodge—I cannot answer that question except by saying that it must be because the red hog breeders are shrewd enough to sell a larger proportion of their stock than other breeders.

Mr. Bayard—The killer says he likes the Berkshire best, but the fact is, that one-half the hogs that come into Pittsburg are red.

Mr. Dodge—I think that comes about probably through this reason: the average farmer thinks he has to have new blood every year; he breeds Poland-Chinas this year, and Berkshires next. Once you find the right type, stick to it, and do not mix your breeds.

Mr. Bayard—Probably the reason for red hogs is that farmers have an idea that they bring the biggest litters.

Mr. Dodge—Some people want twelve or fifteen, while some are satisfied with five or ten.

Mr. McCreary—Do you feed rye with your skim milk? I think it is the best feed there is.

Mr. Dodge—I have never grown it.

Mr. McCreary—Well, now, you take that rye and chop it and mix it with skim milk, and you will see the effects; I have them weigh 160 pounds at four months old, and feed them on rye and skim milk after they are weaned.

Mr. Dodge—That shows for itself.

Mr. Munce—I find that the Western people are running very largely into red hogs now. But there is one thing that cannot be too strongly impressed on the American farmer, and that is to find the one thing that he wants, and then stick to it; start right, and keep at it. Our great fault has been, all over this country, that in horses, cows, and everything else, we do too much experimenting. If you are breeding hogs, breed either Berkshires, or Jersey Reds, or what you please, but don't try to breed a mixture of the three or more. I have been breeding Chester Whites for thirty-five years and if I live thirty-five years longer, I still expect to be breeding Chester Whites. Another fault of the average American farmer is the breeding from immature dams. This idea of introducing a new element continually is, I think, a mistake. My ancestors, as far back as I can trace them, were white men, and I want to be always white when it comes to my descendants, and the same thing holds good in breeding live stock.

President Norton—Secretary Critchfield would like to make an announcement at this time.

Secretary Critchfield—I want to say for the benefit of members of the State Board of Agriculture, that the Auditor General's Department is insisting that all bills for expenses must be attested by affidavit of the parties. So, on the vouchers we are to send you for expenses, you will find a blank affidavit. You will go before a Notary Public and make oath to that bill, and then charge in the bill whatever it costs—25 cents, or whatever it is. Some of you who have just come upon the Board may not know that all hotel bills are asked for by the Auditing Department, so, in order to be reimbursed for your expenditures, see that you have the proper receipts duly attested.

Mr. Herr—That does not mean railroad fares?

Secretary Critchfield—No; the Auditor General has decided that in paying your railroad fares, you state the number of miles traveled, and put down the amount paid.

President Norton—The question has been asked what time the banquet will be held. It will be held at half past eight o'clock. Prof. Van Norman, Mr. Gabler, and Mr. Brown, and Mr. Palmer and Mr. Lantz are the committee; they will see you, or you can secure the tickets from them.

We have had photographs taken of the corn show, which can be had for 50 cents, in the next room.

Next we will be addressed by Dr. William Hill, of the University of Chicago, on the subject of "Agricultural Guild." I have the pleasure of introducing Dr. Hill.

Dr. Hill's address was as follows:

AGRICULTURAL GUILD

By Dr. William Hill

Mr. Chairman, Ladies and Gentlemen:—When Mr. Critchfield asked me to come over here to Pennsylvania and tell you about the educational work for Agriculture that we have started in Chicago, I told him I would do so, but that I should expect to get infinitely more from the enterprising farmers and teachers of Pennsylvania than I was able to give. I have been at your sessions of yesterday and this morning, and in every one of them I have been more than gratified, and have found that their contribution to my enlightenment is vastly greater than I can hope, by my contribution, to add to yours.

One of the things that impressed me particularly, was what Dr. Hunt said before he began to talk, and I shall follow his example, and say a few words on the last topic before I begin to talk.

The last remarks made by the speaker, and the speaker on the floor, in reference to the necessity of taking some line of work, and then sticking to it, is one of the features to be preached to the American people today. It is the one thing I have emphasized in my class work at the Chicago University for the past ten years. Why do we go to Europe for our cattle and horses? Simply because the American has not been a continuous performer. It is horses this year, cattle next year; Percherons, then Trotters; Shorthorns today, Herefords tomorrow—a hotch-potch that nobody wants, and we are going outside, and putting millions of good dollars every year into those countries, where son follows father along a certain line and gets results. If we want to get results in America, we must follow their example, and breed either Percherons or Belgians, either Jerseys or Holsteins, either the Trotter or the Coach horse.

Set your standard high; determine to make it the best that can be made, and then try to reach it. Teach your son to love the stock and follow you; go to the city market and study the best there is there; show your neighbors the way, and do something that will help you and help them. With set ideals, with a definite determination to do the best you can, there can be no question about the results. The trouble here in America has been that we have found this policy too hard. We have been trying to make something that the other fellow has not got—something that would give us the advantage; so we have failed both ways. At the old Quaker Sunday-school that I attended when I was a boy, I learned a text: "He that saveth his life shall lose it; he that loseth his life for My sake will find it."

I don't intend to preach a sermon this morning; simply want to apply it. When we go out and try to get something for nothing—when we chase the dollar so hard that we forget the quality of our work, instead of getting the dollar we are chasing, we lose it. We lose our life when we are trying to save it. We think only of the dollar, and how to make it, and allow our work to become careless, and we lose both. When a man says, "I am going to do good work; I am going to do the best I can; I am going to work at something that should be done, and do it well," the pay will come. That has been my observation. It is one of the most important economic principles I was able to develop at Harvard and later in teaching Economics, but even better than college teaching is the teaching that I have gotten on the farm, working out this principle. I have been on the farm, working out these things for the dollar, and also for the results, and from my experience I can say that the man who will set a high standard, and do the work the best that it can be done, is more likely to get good results and profits, than the man who goes out to get profits and neglects the quality of his work.

Now, there is another thing I want to say before I begin, and that is: I cannot boast of Pennsylvania Dutch ancestry, but I can trace back to Pennsylvania Quaker ancestry for about two hundred years.

Secretary Critchfield—We are proud of both lines.

Now, I will begin. The Agricultural Guild was organized about a year ago at the University of Chicago. It is simply an attempt to co-ordinate the forces now at work for Agricultural education and betterment. The great development of this nation for the last half century, and particularly within the last ten years, has come about through a better organization of the educational forces. The business methods which have been applied in the building of large railroads, starting with little lines, disconnected lines, joined together to make better service possible, have not been applied to agriculture. Eleven lines were joined together to make the New York Central lines, and thousands of smaller lines all over the country united to make a better service possible and they lowered freight rates from three cents per ton mile—to three-fourths cents per ton mile—a combination and organization which was productive of great good to manufacturers, and eliminated the enormous freight rates due to competition. I am not here to talk about combinations, but I will say just one word about that great American problem—not the greatest. We have spent much energy in attacking that problem in the wrong way. We have tried to stop it and prevent combination. We have tried to maintain the old, individual competitive system, the day of which has passed. We will never again see the day of individual competition. The day of the combination has come to stay, but it will not be the day of unrestrained combination. We should be prepared to renounce this individuality, and not to commence the attempt to restrain this natural tendency, which, thoroughly controlled, will bring about beneficial results. What must be done is what our President and some of his advisers have been trying for several years to do—with partial success—to so control these combinations that they will not only make a few successful promoters rich beyond the dreams of avarice, but be successfully distributed among all the members of the community whose co-operation is necessary to produce the results.

Now, coming again to my text, studying these principles, and teaching railway, banking, and other forms of them in the University of Chicago, and, of course, Economics in Agriculture, led me to see the relation between Agriculture and other interests, and to see the difference in it. The farmer works as an individual, instead of having the benefits of combination, as do the railroads, the factories, the bankers, who see more clearly the necessity of this. In the whole scheme of things the farmer has the least protection. The land is the foundation on which all the great superstructure that has been built up in America rests. And because the natural conditions were so favorable to agriculture, and our resources so rich, it has been possible for the farmer to produce easily under conditions that would have driven the business man into combination long ago. He has been able to produce under the old individual system; although the daily tendency has been toward combination instead of competition, the farmer has been allowed to do as he pleased, and continue the system of individual competition. They only work together to serve their own interests. Our neighbor over here breeds Chester Whites, and is successful; this makes his neighbor a little jealous, and, in order to be looked upon as a leader, he takes to breeding Berkshires. What is the result? People who come in from the outside get in some instances Chester Whites, while others get Berkshires; the same thing holds true in cattle, and in horses. Now, when a man wants to buy Jersey cattle, or horses of a certain kind, or anything of a particular breed, where does he go? He goes into the neighborhood where these things are bred, rather than to some individual breeder. This is well illustrated in Wisconsin, where farmers have been breeding a particular strain for two or three generations. You will find men there who have bred Holsteins, or Chester Whites, or Jerseys, or Percherons, or Belgians, for two or three generations, and they are successful; people know they will get what they want when they go into these neighborhoods where they have been bred.

The great thing about Agricultural Colleges is the co-operation and co-ordination of the existing agricultural forces, and that is our plan in forming the Guild—to use co-operation and co-ordination of the forces already existing. Now, what does the University furnish; what does the farm owner furnish, and what does the student furnish? It is the co-operation and co-ordination of these three forces, and, I might add a fourth, which is more important than any of them, and that is the Agricultural Colleges, the men who are leading the way to agricultural education. That is the Guild, and the combination on which it rests. It is not undertaken to duplicate the work which the Agricultural Colleges and the other interests are doing, but to supplement them.

A number of wealthy, successful business men of Chicago have bought farms outside the city, as the tendency of the day is. Some of them were men who had grown up on the farm but had not lived on it. They had been driven from the farm by the natural tendency which has prevailed during the last forty years. What were these forces that tended to drive men from the farm? What is the economic reason which has changed the American people from 95 per cent rural fifty years ago to 50 per cent rural today? Why are all the people today in Russia and China living on the land? Why are practically all the people in Mississippi living on the land? Simply because the economic efficiency or productive capacity of the individual is low. When one person can produce only enough to feed himself, there is no possibility of artistic and literary development or any development which makes for the cultured side of life. In the hard, pioneer conditions, when we were struggling to feed ourselves, our farms on the stony low lands of New England and of Pennsylvania, New York and Ohio produced practically all, and the energy of the people was necessarily directed to the production of food enough to supply the necessaries of life. With the opening of the pioneer prairies of the West, came the invention of farm machinery, and better plows and harrows and harvesters took the place of the cradle and the sickle and the scythe, and all of that farm machinery is the product of inventive American brains; and the ingenuity of the American inventors has been largely increased by the growing demands of the farmer for more and better machinery; all this has made it possible for the farmer to have many things that were formerly denied him—possible for him to make use of the artistic and luxurious development of the last half century.

The economic cause of the movement of the State from agriculture to industry, is the increasing efficiency of American farm labor through machinery, and through better land on which to apply this labor. Today, one man feeds not two or three, as he did in pioneer days, and as he does today in Russia, India, China, and Mississippi, but he feeds a hundred. The teeming thousands of New York and Chicago, the teeming centers of America, and of the old world, are largely fed by our American farmer. So it is perfectly natural that we should have people moving from the country to the city.

In the economic movement from the country to the city, what elements are most likely to shift? Is it the bright and efficient labor that passes from the old industry to the new, or is it the man who is less active, more satisfied with existing conditions, more ready to do what he is doing, and what his father did? I need not answer that question. The energy and brains and efficient leadership of the last half century have been centered in the cities; they have built our railroads and established our commerce, established our cities, and made the United States occupy the position it holds today, the leading nation of the world. And the farms are the superstructure on which this nation is built; they are the foundation upon which all this energy and power which makes for the leadership of the world rests. But in what condition has that movement out of agriculture left agriculture? What has been the status of the farm? One often hears it said that the farm is a good place to be born, and to grow up on if you get away soon enough. Today the business man who has had all the success the business world can give is beginning to say that the farm is a good place to return to, and the sooner he can get back to the farm the better. One of the successful men — a member of our Agricultural Guild—said to me (I had been spending the day with him most pleasantly at his beautiful farm, among his fine Guernsey cattle) "I count every day lost that I must go into the city." The conditions under which a man can live, under which his children can grow up, the contact with Nature, and the absence of all the artificial, that goes best with city life, makes it natural that any sane man who has seen all the attractions that city life can give should long to return to the simpler and more wholesome conditions of the country. This tendency to return to the country is very strong today. It is necessary to understand these forces to see how the Guild developed.

A number of these men who have gone from the farm, and have made a success in the city, have now decided that they will make their homes in the country, and there spend their declining days where their children can grow up on the farms about Chicago. Many of them expected to apply the business methods which brought the success in building railroads, or banking, or commercial life, to these farms. What difficulties did they encounter, these men who have moved from the city to the country? First, the serious dearth of good dairymen, men capable of taking charge of their herds of fine cattle, and of men capable of carrying out the orders such men give. If a man of this kind wanted to build a railroad he could hire men to carry out his orders and construct according to his plans. Where can you find such a man in agriculture? What proportion of education is necessary to equip a man so that he will be competent to perform these duties? Do our agricultural colleges educate a man for this? Many of these men have had agricultural college graduates on their farms to take charge of some of the departments on these farms. With what results? In most cases, with disastrous results — in some cases extremely disastrous. One of these men a year before the Guild was organized went to the leading agricultural colleges of the West for a man to take charge of his high-class dairy and farm. A graduate was recommended to him who was said to be the best in his class, and, in addition to that, had had a considerable amount of practical training. This man was employed at a good salary and given charge of the farm. A practical man, with little college training, had given up the position because of the illness of his father. When he left the herd of one hundred cows was producing, on an average, about eighteen pounds of milk per day. Records were kept, and the herd was in good condition. This college graduate had charge of the herd a little less than three months. At the end of that period the average production was eleven pounds per day. When he left, the records were in such shape that nothing could be told about the condition of the farm, and, worse even than that, from a moral standpoint, bills amounting to eighteen hundred dollars, which had been supposed to have been paid from month to month, had been covered up to make a showing. A carload of cattle, which this man had been sent to a neighboring city to select, had been bought at a very high price, and at the end of a year's time only three of them proved to be worth anything — worth keeping in the herd. Of course, this is an extreme case of the inefficiency and dishonesty of a college graduate. I would not take it as a typical case, but a number of instances, not so striking, followed from placing in responsible positions university men, making it difficult to get any man who had been operating a farm by proxy to want to get college men.

That was the status I found when we organized the Guild. One thing I have learned at our colleges: that the men who have had all this theoretical training which the colleges afford, when they have gone into positions for which they have been recommended, have failed so dismally that we have decided not to recommend for positions of responsibility any of our graduates, until they have had a reasonable amount of practical training and experience. It was to secure this practical experience that the Guild was organized. It was to give these men, college men and others, an opportunity to fit themselves for the management of others' farms, or possibly their own, that this work of the Guild was undertaken.

We cover two sides of need: the need of the student to have the opportunity to get this practical training to fit him for the responsibility to be placed upon him, and the need of the farmer, whom either lack of knowledge of agricultural conditions, or pressure of other business, prevents from taking charge of his own farm. So, when some of these men and their neighbors came to me and said, "What can you do to help us; what can you suggest?" I gave them the results of my own experience. I grew up on the farm. I had never been away from the farm until I went to college; when I finished college, I went to teaching agriculture along with these other economic subjects, and at the same time had charge of the old farm of five hundred acres. I had the same kind of experience as those I have just told you. I had, in a number of instances, taken men who wanted to learn how to farm, to do the work on my farm, under my own supervision, but after a year or so, when a man had become competent to take charge of the work, he would want more money than the proceeds of my farm enabled me to pay, and he went to one of the agriculturists who could pay more. I probably do not need to define to this audience the difference between an agriculturist and a farmer; the agriculturist is the man who makes his money in town and spends it in the country, while the farmer is the man who makes his money in the country, and spends it in town. From my own experience, I had decided to do some experimenting, and secure a young man who had some college training, and eight or ten years' practical experience, to take charge of my farm; and after talking the matter over with these gentlemen, I decided to let my farm be used for the purpose of training young men, so that after they had the theoretical part they could get two or three years' practical experience on the farm, under proper guidance, and then, when they were competent to take positions of trust, positions would be found for them. It was simply trying to do systematically what we had been doing unsystematically. I suggested to these men that if they would allow their farms to be used for this training they would receive benefits, as well as the students, because it was so hard to get reliable laborers for their farms. Ten farm owners, whose farms were near together, about Chicago, undertook each a specialty in some particular line. The University was to get them expert advice from the agricultural colleges and successful farmers, as to what lines should be undertaken on each farm, due to the relative condition of the farm. A superintendent was put in charge of each farm. The requirements were: His practical ability to make that farm a prosperous farm. I put that first, because I have observed the methods of educational men in their business training. Second, a theoretical, scientific and technical training, which would enable him to plan the work on that farm and conduct it in such a way that every man who was working under him would have the advantages he could get from doing the work in the right way. We learn how to do by doing. Third, business sense and judgment. That, perhaps, would be a subhead under the first practical requirement, which was making a prosperous farm. You will find men who can grow good crops, but do not know how to market them. Then, another important requirement is enthusiasm, and love of the work they are doing, and effort to inspire the men who are working under them with this love of the work, so that the whole organization would move them to good spirit and eagerness to accomplish the best results.

You will readily recognize that such a combination is rare, and that you cannot find every day men who combine these qualities, and I frankly and sorrowfully confess that we have not as yet found a man who can anything like come up to these requirements—but that is what we are trying to do and to train men for.

Numerous applications came in. We selected a number of men and started them to work on the different farms we had in the meantime secured. Some of these men had the idea that a good many college graduates have, and perhaps a good many more graduates of non-agricultural colleges have than of agricultural colleges—that their education fitted them to tell other people what to do, instead of doing it themselves, but, upon their application, I impressed upon them by numerous letters this first condition, this first requirement: "You will begin at the bottom, and do the hardest and most disagreeable work of the farm, for two reasons: first, to see that you really can do it; and second, to see as to your staying qualities—to see if you really want to do farming, and the hard disagreeable duties of farm life. If you can't, we can't afford to put up with you; we are selecting the men who have practically decided that the practical in agriculture is more to their liking than teaching in an agricultural college, or professional or commercial pursuits open to them. I really think that any man who has carefully considered the opportunities, and then decides that he wants to make this his life work, if he wants to make farming his life work, gets more opportunities for development, good health and pleasure than he could win in any other walk of life, or in any one of the many openings that are offered everywhere in America. I don't mean that he will become actually wealthy, but he will be sure of a good living, and, to a great extent, of a good home, and a good, wholesome, healthy life. What are your children going to be if they grow up in the slums of the city? If you are really in earnest and want to enter our work, I will give you two years to prove it in."

Immediately after our plan was advertised, I received a letter from Minnesota, from a young business man, who said he had graduated at Yale five years before; he had enough money to buy a farm, and was offered the management of a large ranch, but before buying a farm, or undertaking the management of another man's farm, he wanted to qualify himself to do the work intelligently. He knew nothing about it whatever. We have generally taken the view that any one is able to run a farm; men have gone into this work without anything like the training that would be required in any other work. Everybody knows the training that is required of engineers and professional men, but we have not thought it necessary for farming. This man was a college graduate, and he knew if he wanted to go into farming he must get a wider experience than he had. I did not encourage him to come; I told him he would have to do the hardest and most disagreeable work on the farm. This did not discourage him, and he came down from Minneapolis to see me and I emphasized it even more strongly. That did not deter him; he came, and put in his time, one-half of each day in putting the books into excellent shape, and the other half he learned how to plow and do all the other things that the successful farmer must do in order to accomplish anything. He worked through the summer, and then we advised him to take a technical training in one of our agricultural colleges; he is there now, and by next spring expects to be ready to take a position. That man was getting several thousand dollars a year salary, and is now prepared to be one of the best kind of farm managers.

Another instance: A young man who was receiving a good salary from one of the large automobile companies wrote me. I told him what I had told the other man, but he was not discouraged. He came to Chicago to see me from Cleveland. He had never been on a farm, but was determined to get on the farm. He had followed his father in the shops, and had watched the effect. His father was getting several thousand dollars, and he, himself, had been there eight years and was getting eighteen hundred dollars. I said to him, "The profession in which you now are offers greater opportunities than you will have in farm work; at your age (he was then 28) you have an excellent start, and you will not make in farming anything like the amount you are now getting." He said, "I can live on the farm without that much." I reminded him of the hard and disagreeable work he would have to do on the farm. He went home and thought the matter over, and then decided to come. He resigned his position with this company, which sent him all over the country to design new parts for automobiles. Here was one of the suggestive things he said to me: he said, "They are always hurrying me; we are always under pressure, and I never have time to get things out." He said he had to hurry and get things out for this year, and then go ahead and make changes, so as to make people want to buy new machines next year." This young man was an artist, and had the artist's sense of work. He said: "I want to do something, where I can do something worth while, and do it well, and I am now going to see whether horticulture and poultry won't give me a comfortable living. I am investing my own money, which I have saved, and I want to make the experiment." When he came to resign his position, the company was so anxious to keep him that they offered him three thousand dollars a year. He was not one of the discards of the manufacturing world, but was offered three times the salary the average farmer makes in a year. I told him that unless he was unusually successful in farming he could never hope to make the same amount in farming. That made no difference; he was determined to try it for at least a year, and then, he said, he would have the satisfaction of either knowing that he could do it, or that he must go back to the shop.

These are two practical illustrations of the class of city men that come to us. Now, about college men. We had ten graduates of the best agricultural colleges in the country in the Guild the first year. Three of them fell off quickly. One of them, it seems, had been on the farm, and knew how to do farm work, but was not willing to do it, and wanted to tell us how to run the farm. There were plenty of things to criticise on these farms; there always are. He was always criticising, and wanting to get a responsible position at once; so we let him go. Two others fell by the way because they had not the physical strength to farm or willingness to do the work mapped out. The other men, five of whom had farm experience, had grown up on good farms, and then had a college training, went to work at the bottom, at twenty-five dollars a month. Within a month they were advanced to thirty, and worked for that for two or three months, advancing from time to time, until today those men, with only six months' training in the Guild, are in positions that give them opportunity for growth and development, and they are getting very comfortable salaries. We expect to pay all a man is worth, but we distinctly emphasize the quality of the work, rather than the pay for it. I say to these young men, "You can get more money by teaching, or going on the farm of some wealthy man who does not know how much your services are worth to him, but you will not get the practical experience; if you want to get into contact with the best men, and are determined to go into Agriculture, we have the best inducement to offer. If your business associations are such that you want to take up this work, we want your energy and time and your brains, to help us to elevate the status of Agriculture."

Mr. Van Norman—I move we adjourn.

Mr. Bayard—Don't forget the banquet this evening, at nine o'clock. This is as early as they can get the dining room ready for us. Tickets are $1.50. Last year and the year before the banquet was one of the best features of our convention, and we want to make this just as good. There will be some good toasts, and other good things. Get your tickets at once, so that we may know just how many to provide for.

President Norton—I would like to appoint a committee to consult with William J. Rose, Division Freight Agent of the Pennsylvania Railroad, in reference to the shipment of horses and stock to the fairs. I will appoint on this committee: Dr. Carl W. Gay, Mr. F. W. McCoy, Mr. James Blair, Mr. J. E. Dodge, Mr. J. W. Oakey, Mr. Henry Fielden and Mr. W. W. Blake Arkcoll. They will take charge of the matter, and report tomorrow morning.

Prof. Hamilton—I want to emphasize the point made by Dr. Hill. I tell you that in agriculture, as in everything else, practical education is essential. I am appealed to time after time by men in position to employ managers, and they say, "Where can I find a man who can take charge of my farm and not break me up?" Our agricultural colleges do not yet turn out such men. A man came to me and said, "Where can I find a manager for my fine estate, and a hundred fine cows?" I told him of a young man whose name had been mentioned to me, who knows the theories all right, is a graduate of an agricultural college, but whether he will get up at half past four any morning, and put his men to work, or whether he has business capacity to sell the products of the farm, I don't know; or whether he is able to manage men, or direct them in the practical management of the farm, I don't know, and nobody knows; the young man himself did not know. That is the risk one is running. He employed him and the young man failed.

Another man came to me some time ago, who owns a farm of over nine hundred acres, and over a hundred fine Jersey cattle—everything to make an ideal place, and he said, "I feel like selling everything I've got and getting away. I can't get a manager for my farm. Early in the morning there will come a knock at my door, and there will be the manager, who says, 'The gasoline engine won't work, what shall I do?' and then I have to get up and go down and fix it. The next day he says 'The cow, Daisy is sick; I wish you would come down and look at her.'" He was undertaking to manage the farm but didn't know how. He was like an engineer who knows enough to open the valve, but not enough to run the engine, and when anything goes wrong he calls out the passengers and says "What do you think is the matter, anyhow?" When you get a manager you want one who knows how to do everything from start to finish. When I first went to work at State College I expected to start in doing two or three hours' work in the afternoon, but the boss said to me "Clean out the cow stable." It had not been cleaned out during vacation, but I started in and cleaned it out. I want to say today that no agricultural college is an agricultural college unless it has from twenty-five to fifty farms—dairy farms, stock breeding farms, poultry farms, truck farms—every branch of farming—so that the young fellow can start out and get practical work, as well as theory. He is there two years, and has kept books to show what has been done by him, so that when a man comes and asks for a young man to manage his farm, you can say to him "Smith is the man you want." "How do you know?" "Here is his record, and he is worth all you can pay him." In this way you can be sure of not making a mistake when you recommend a young man as manager of a fine estate.

I hope our agricultural colleges will follow what has been undertaken by the University of Chicago, and establish farms on which the young men shall go and get practical training, as well as theoretical training in the class room.

My father graduated at Jefferson college, and afterwards studied medicine, but he never practiced it. When he came home he saw things were in such a condition that he had to stay home and take hold, but he said, "I was a man, and did not know the difference between a shoulder and a ham." Now, a man may have the theory of things, but unless he has actually done them with his hands he will find his theory of little avail. He must be practical, as well as theoretical. I was down in Virginia, a number of years ago, and was making a speech to a number of old farmers down near Culpepper, and they gathered round there, and at last, during the dinner hour, one of them said to me "Did you ever farm?" "Well," I said, "I have two or three farms up there in Pennsylvania." "Oh," he said, "that is not what I want to know; did you ever work at it with your hands?" And there was the point: was I competent to give advice? He knew that if I had not worked with my hands I could not do so—I was not competent to give advice anywhere. Now, that is what we want—men who can talk about the science of agriculture, and also make it profitable as a business.

President Norton—We will now stand adjourned until 1:30 this afternoon.

Thursday, January 28th, 1909.
1:30 P. M.

President Norton in the Chair.

The President—The first topic on the program this afternoon is "The Outlines of Breeding" by Prof. F. R. Marshall, of Ohio State University. Ladies and Gentlemen, I have the pleasure of introducing Prof. Marshall.

Prof. Marshall spoke as follows:

"THE PRINCIPLES OF BREEDING"

By Prof. F. R. Marshall, Ohio State University

It is a noteworthy fact that most of our successful breeders of live stock have had but little to say in regard to the principles that constituted the basis of their practice.

It is not true that the reticence of these masters in the art of breeding is due to any unwillingness to benefit others by sharing their knowledge: it is impossible for them to impart by word of mouth the accumulated outcome of their experiences, and even should they do so, it would, to many of us, seem so commonplace as to be disappointing.

Because of the paucity and the seeming indirectness of expressions from those to whom we naturally turn for direction, the literature on the subject of breeding has practically all been written by persons who are students of the experience of those actively engaged in breeding. In these works the scientific has had little place; indeed, in all the books written previous to 1906, several chapters were devoted to reviews of claimed facts and ridiculous views, the absurdity of which is only accentuated by the lack of agreement among the theorists. These authors endeavored, from a study of the practice of breeding, to formulate a science of breeding, and they failed, because the operations of the laws of heredity, and the history of the reproductive cells, are too involved and too intricate to be intelligible to anyone whose contact with the subject has been limited to the practical side.

Progress is usually effected by a succession of extremes. We have viewed the effort to formulate a science of breeding from the practice of breeding. Now we have an effort to formulate a system for the practice of breeding from the science of the subject. Not only are we led to believe that breeding is becoming a science, but that it is to be an exact science.

The past eight years have been extraordinarily productive of discoveries and additions to the knowledge of biology. Heredity is less a sealed book than formerly. Occurrences in the plant and animal world, formerly impossible of satisfactory explanation, can now be accounted for. In some limited sense, predictions can be made as to the outcome of certain matings. In the exuberance over the partial insight that permits such explanations and predictions, it has been assumed that with the newly acquired knowledge the work of the practical breeder is to be revolutionized. Impatience has been manifested, because the breeders seemed so apathetic toward the possibilities of the application in practice of the findings of the laboratory.

Without going into detail, it may fairly be stated that an understanding of Mendelism, for example, while not permitting anything previously impossible, does add a degree of certainty, and facilitates endeavors to fix upon our animals new small characters, and may play a part in the future evolution of our breeds. Evolution, however, is not premeditated, and while recognizing the probability of further changes in our best types of the present, we, as breeders, must be less concerned about new characters and more interested in the matter of adding greater certainty to the outcome of the matings in our herds, and thereby bring the rank and file of our breeding animals nearer to the excellence of our champions.

In this work of general improvement the progress of the scientists is of great indirect service: the limitation of their service forces us back upon our own resources. We see clearly that there is to be no short cut to our goal, and that our advancement must be by more assiduous attention to those forces we have had with us, and which we have been prone to underestimate in our eagerness for the new and the startling.

I have spoken thus of the minor practical value of recent scientific developments mainly, because there is a considerable probability that beginning breeders, familiar with the literature of the day, may too lightly regard the seriousness of their calling, and also as a protest against any disposition to lightly esteem the astuteness of the breeding fraternity, or its past and present celebrities.

Any person really familiar with actual stock breeding, who will also make a full study of the theoretical side of the subject, will be amply repaid for so doing, by coming into possession of a greatly increased respect for the value of the information he previously possessed, and by the unvarying uniformity with which the findings of the scientist are corroborated in good breeding practice.

Our faith in, and practical appreciation of some of the tenets of breeding, may be increased and quickened by an examination of some well known but often overlooked facts. We continually speak of the blood of our animals, "Blood will tell" and "This one is rich in the blood of the winners," are expressions of a common kind. Doubtless the term "blood" expresses our idea that the essence, the life-giving principle of one animal, has been transferred to another. The actual tangible material that does really pass from generation to generation is really something that can be studied much more satisfactorily. -

Every animal is the product of two microscopic bodies, one contributed by each parent. Because microscopic, the nature of these bodies is not commonly understood, and yet, within them, and them alone, are contained the contents of all that the new animal ever can, or will be, either individually, or as a breeder. In the male these small bodies—the spermatazoa—are produced in large numbers. The most interesting part of their development is in the stages immediately preceding their readiness for use. Whether we consider the spermatazoa of the male, or the eggs or ova of the female, we find the conditions similar. Each contains a small centre of activity, much in contrast to the rest of the body of which it forms a part. The contents of this centre of activity are present in still smaller bodies, the number of which never varies in the same kind of animal. The most accurate count obtainable shows that in their first form these male and female bodies, that produce a new animal, each contain in their active centres 16 of these more minute structures. It was said that the number of these bodies in all cells of animals never varies within a species. Evidently then, if the new animal is to start with its proper number of 16, a reduction must occur in the paternal bodies, prior to their union within the body of the dam. As an actual occurrence, both the male body, or spermatazoon, and the female body or egg lose some eight of the sixteen bodies we have cited, and thus the life of the progeny is inaugurated with the number normal to its kind, equally contributed to by sire and dam. There is good reason to believe that these eight contained bodies are the chief, if not the only part of the reproductive cell, that plays a part in heredity. So far as it can be determined, it is altogether a matter of chance, which eight of the sixteen bodies will find their way into the cell through which the parent contributes to the offspring.

Since this hereditary substance is of such complete importance, it is exceedingly interesting to know from whence it was derived by the parent. Manifestly the parent also must have received its supply in equal amounts from the grandparents. In the early stages of embryonic life, a portion of the same material that was contributed when the parents were mated, is set aside in the reproductive organs of the new animal, while the remainder goes on to control growth and development. This vital material, set aside in the reproductive organs, increases in amount, and in due time produces other bodies to originate new animals, but its make-up, or the qualities represented within it, is not more than very slightly, if at all, responsive to conditions affecting the body.

We have here the two vital, fundamental facts: first, An animal is formed from the same material that it transmits to its offspring; second, the hereditary substance is not materially affected by the manner of life affecting the body of the animal within which it happens, for the time being, to reside.

An animal is valuable as a breeder, in proportion to the qualities represented in these interesting bodies contained in the cell that it contributes to each offspring. We do not believe that one can materially change the make-up of those bodies, by anything we may do to the animal, in the way of care, feed, or training. We can judge of what they will contain, largely by studying the animal, because its body was formed under the control of part of this same material. This is commonplace individuality.

However, an animal may develop into what we regard as a good individual, because of the predominance, and mastery, of some superior and more powerful of these sixteen bodies, and yet, when his breeding time comes it may occur that of the sixteen, the greatest number of the eight separated out will represent the weaker and the inferior, and the good-looking animal is a failure as a breeder because his hereditary material is of a mixed character. Obviously then, individuality itself is not a sufficient guide. We must also arrange that our sire has had opportunity to receive hereditary material only from animals that were satisfactory breeders. We must select his ancestry; we must have his pedigree right. There may be an illustrious ancestor in the third line, but an inferior one in the same line has equal opportunity for representation in our selection.

It is imperative that we place equal emphasis on the chance for influence from equally remote ancestors. The appearance in a pedigree, of a cow that is the foundation of a family, is of no value, unless her qualities are especially noticeable in her descendants, to the exclusion of those of other cows in the same line. The grandam may have been a show cow, and incapable of reproducing her excellence, and therefore be a menace to the prospects for satisfaction in the offspring of our selection.

Again, sire and dam, in the turmoil of the showring, and the variability of judges, may each have been champion, and yet dissimilar in type and ancestry, and altogether unlikely to endow their progeny with the excellence of either parent, or even with blend or intermediate type, which he himself exhibits.

The selection of proper individuals, to represent the composite, uniform excellence of all the ancestors, is our only means of controlling heredity. It is highly improbable that one man can ever secure by purchase a considerable number of animals of similar breeding, and combining his idea of excellence in individuality and ancestry, and until he has such a group of females he will expect some unwelcome appearances, and many lots on which the buyer, and not himself, will do the pricing. Only by a succession of good breeding bulls and by rigid culling, can such an object be attained.

We have said that the hereditary material is not largely responsive to the environment of the animal. This in no way lessens the need of giving to each young thing the fullest opportunity to show what it is made of. Otherwise, one is selecting under a serious handicap, and the youngster which lacks power to develop the qualities which we are emphasizing, must be eliminated regardless of his ancestry.

Evidently the securing of a herd from which we are justly entitled to expect a majority of prizes, is not the work of a day, nor of a decade. It is not possible to fairly estimate the value of a herd successfully mated, and dispassionately culled for half a dozen generations, and to no one can they be as valuable or represent such opportunities for profit, as to their breeder.

Undoubtedly there has been in the past an unduly high regard for stock that had crossed the water, and yet, how often have we seen the imported bull that was not of show yard calibre, siring a line of stuff strikingly uniform in excellence, not because he was reared abroad, but because his ancestors had been conscientiously selected and culled for so long a time, that all undesirable possibilities were eliminated.

The same care and intelligence, similarly continued in America, produce the same result, and are equally appreciated by really discerning buyers. As an illustration of conscientious selection, allow me to refer to an incident that came to my attention some weeks ago. Mr. James Leask, the breeder and exhibitor of the 1907 champion steer and the reserve champion of 1908, was in need of a herd bull. After several months' search he decided to purchase one of two calves, both owned by the same breeder, and went to make his selection. He was forty-eight hours at the place before he came to a decision. In one particular instance I knew of, Mr. N. H. Gentry, of Berkshire fame, was deciding as to which one of his boars a certain sow should be bred. The choice lay between two boars, both of which he had raised and watched from birth, and the same was true of the sow; yet it was only after an hour's hard study that he indicated which lot the sow should be driven to. Such study and care gave Mr. Gentry a Longfellow and following him, boars of such an order that he was safe in using them in preference to the best he could procure elsewhere.

President Norton—Any questions on this paper? If there are none, we will proceed with the program.

President Norton: The next subject is "The Pennsylvania Stallion Law" by Dr. Carl W. Gay, but before we take that up, we will have the report of the Committee appointed last winter to look into the matter of "Hereditary Unsoundness," after which we will listen to Dr. Gay.

REPORT OF THE COMMITTEE ON HERDITARY UNSOUNDNESS

Presented by Mr. Powell

Your Committee find that they have been given a very important question as to the stallion law. It has brought many serious difficulties.

As we all know, our Pennsylvania law was copied mainly from the law of Wisconsin, and I notice that within a comparatively few days another Western state has adopted about the same thing.

The serious defect in the law is the certificate required. The law says that the breeder or owner of the stallion shall furnish a certificate, signed by the Secretary or President of a registry association. Now, as a matter of fact, in many of the associations, the certificate is signed by the printer, in facsimile, and not by the President or Secretary, but I think our breeders very honorably considered such certificates as issued by the association.

Another serious defect in the law is in the classification. They issue certificates to full-bloods, cross-breds and grades. Now, full-blood means something. The cross-bred doesn't mean anything except a mongrel, with some goods to sell. It makes a vast difference, however, for what purpose a horse is bred. If you take a cross-bred horse, for instance, sired by a Percheron on a registered mare of Clyde or Shire, or any one of the recognized breeds, it would be all right, but if you use the draft horse upon the pony, though both may be registered, it would not be the same thing. In the one case you may have the value; in the other, the horse should not be recognized for breeding purposes. It is supposed, for instance, that you use a registered, recognized horse of the coach variety; that, crossed upon the road animal, we get the best kind of a valuable animal, although, if used for breeding purposes, you could use the same coach horse upon something else that the lines do not run parallel with—so that the law is very defective in that respect, so far as cross-breds go.

Then, again, when you get to grades. They may be practically full-blood, and by registered sires, but they must be known as grades. Some of them may be 31-32 full-blood, or even 63-64, and this is preferable to many registered animals; or the grade may be made up of a mongrel on a mongrel, so that, practically, the law is so defective in that respect that the breeder can only fall back on his own judgment.

Now, that is in reference to the law as it now stands, but your Committee was appointed more especially upon Hereditary Defects. My own practice in breeding is to keep far away from any form of unsoundness that may be transmitted, but, unfortunately, there are stallion owners who do not do so, and, as a Committee, we are placed in an embarrassing position. We are in position between justice to the breeder, and at the same time injustice to the stallion owner. We have tried to make a very conservative report based upon investigations and observations. I have learned that my colleague Dr. Marshall, of Philadelphia, has recently delivered an address before an association in New York on this subject, and, on getting a copy of this address, I find he has pretty well covered this question, so I got his consent to read his lecture on this occasion. No doubt, you will want to ask a good many questions, and, so far as I can tell, the Doctor will be very glad to answer them. I shall ask Dr. Marshall to come forward and read his address on that subject. It happens to strike this question very fully and sufficiently.

President Norton—I have the pleasure of introducing Dr. C. J. Marshall, a member of the Live Stock Sanitary Board of Pennsylvania.

Dr. Marshall's paper follows:

HEREDITARY OR TRANSMISSIBLE DISEASES IN HORSES

By Dr. C. J. Marshall

Certain defects in animals are known to be transmissible, while others are so considered for the want of a better explanation. Tuberculosis was believed to be hereditary for centuries but the searchlight of modern science has shown that this factor plays an insignificant part. The future will reveal the true cause of other diseases.

Governments and a number of states have adopted stallion registration laws for the purpose of improving type and soundness and to assist and encourage the breeding of better horses. In most cases the law attempts to prevent the use of horses that are off type or have hereditary or transmissible unsoundness, or are afflicted with contagious or infectious diseases. Very few authorities state definitely what such defects are. Veterinarians often experience difficulty in passing judgment upon stallions for which licenses are requested and are frequently criticised for condemning or passing them as serviceably sound for the stud. At horse shows and fairs similar questions arise. Some may be afraid to exhibit valuable sires for fear that an unknown or abnormal condition might, unjustly, be considered hereditary, and thereby ruin the reputation of the horse. For these reasons, veterinarians should have decided opinions in reference to the most common defects and work uniformly as much as possible, in passing judgment on horses for breeding or show purposes.

In order to collect evidence on this subject, a circular letter was sent to about sixty well known breeders and the same number of veterinarians who have had experience in breeding. Their opinion was asked in reference to the following defects which are commonly believed to be hereditary: Vicious habits, blindness, roaring, emphysema, spavin, curb, ringbone, sidebone, navicular disease, osteoporosis, deafness, stenosis, light bone, contracted feet, faulty attitude of limbs, low back, weak coupling, cryptorchidism, stringhalt, shivers, and crampiness.

In looking over this list many defects will be seen that may be produced by accident. While it is not difficult for a person of experience to recognize some of them, it is sometimes impossible to discover the true cause.

The subject of heredity is very complicated and it is not to be expected that the present generation will be able to solve all its mysteries. Many horses are sound from a breeding point of view that are not even serviceably sound for saddle or harness purpose. Conditions that are caused by accidents, over-work, bad care, and some acute diseases, should not ordinarily condemn for breeding purposes, yet they may render them practically worthless for work.

Let us review the etiology of the listed abnormal conditions, and see what part heredity plays in producing them.

Vicious habits cover such defects as kicking, biting, running away, cribbing, weaving, balking, etc. Most authorities agree that traits of character are transmitted, yet it is known that in a large majority of cases such defects are due to bad handling, and with proper treatment many horses with decidedly vicious habits will become the most amiable. Nature has apparently done her part well, yet man's ignorance has made it appear a failure.

Several breeders, as well as veterinarians, have seen cases where such habits were transmitted and consequently believe that they should receive serious consideration from a breeder's point of view. Dr. John V. Newton cites the case of "Marcus Claudius," a draft stallion that he owned. This horse had a mean disposition, and fifty per cent of his get were affected in the same way.

From the evidence collected it would appear that horses vicious by nature should be excluded.

In reference to blindness, two forms are questionable, viz.: periodic ophthalmia and cataract. These diseases are much more prevalent in some sections of the country than in others. A few breeders, as well as a number of the leading veterinarians, expressed positive opinions in reference to their being hereditary. In the Report of the Veterinary Examination of Stallions by the Department of Agriculture in Australia, cataract is listed as an hereditary unsoundness. In the human family, cataract of childhood is looked upon as congenital, while cataracts that develop after maturity are not so considered.

Periodic ophthalmia is not seen in the human family and yet it is practically the only recognized cause for cataract in horses. In the great majority of cases periodic ophthalmia develops only after maturity. Congenital cataract has been known in foals.

Some of our text books and many of the most thorough investigators consider ophthalmia as infectious, and cite a number of interesting cases as proof. It would appear that there is more reason at present for excluding sires or dams afflicted with this disease on account of its infectious nature than from an hereditary point of view.

Roaring and broken wind are listed as hereditary by English and Australian authorities. None of the correspondents reported a case where the trouble was believed to have been transmitted. Dr. George White, of Nashville, Tenn., reports one sire and twenty-five dams that he has known to be roarers, but mentions none of their get that were affected with bad wind, yet he believes the disease to be transmissible under some conditions.

"Prince Charley" was condemned for the stud in England, but was purchased and brought to Kentucky by Mr. Daniel A. Swigert. He sired two crops of colts but none of them had bad wind, so far as is known. Among his get can be mentioned the well known "Salvator." Some of his get have also made good sires and transmitted his good qualities, but no roarers.

"Ormonde" is another example of a horse rejected by England for roaring. None of his get, in either the Argentine or this country, have been reported as affected in the wind and a number of them are well known.

Roaring is found in all breeds and all families of horses. Many of the best draft stallions have been condemned on account of roaring. Some have developed this condition after being imported at great expense and were rejected from the stud for this reason. It is well known that the disease often follows influenza, strangles, pneumonia, etc., and it also develops from unknown and mysterious causes.

Experience would indicate that horses should not be excluded from breeding on account of roaring alone, in the absence of a history of roaring among the immediate ancestors, especially if the conformation of the neck and throat is good, though extreme caution should be exercised in the use of stallions so affected. There is no clear recorded evidence for rejecting breeding animals afflicted with heaves or emphysema.

Spavin was described by the oldest writers on the subject of veterinary medicine and the subject has received almost constant attention for hundreds of years. Many causes and theories have been advanced. They have been classified in various ways by different authors according to supposed causes and the pathological changes observed. At the present time a spavin is considered a chronic inflammation of the hock joint. Moller justly says that it is a collective, clinical term covering a number of extremely diversified anatomical changes in the hock. We recognize bog and bone spavins. Bog spavins are soft, painless enlargements seen on the inner, outer, and anterior faces of the hock. They are the result of an excessive distension of the capsule of the hock joint with synovia. The contents of the enlargement may be forced from one point to another by pressure. The condition is sometimes called thoroughpin. It seldom causes lameness except when in the period of formation or after hard work in cases of excessive distension. It may be seen in young as well as in old horses.

Bone spavin usually appears as a hard bony enlargement on the internal face of the hock. It may show on the posterior face where a curb develops. There may be heat, tenderness and lameness, or the enlargement may be seen with none of the other symptoms present. In some of the most obstinate forms of spavin, there may be intense lameness and no apparent enlargement. It may be observed in horses with hocks of excellent, apparent or superficial, conformation. For this reason spavin is often difficult to diagnose.

Bad conformation is one of the most common predisposing causes of spavin and such conformation is unquestionably hereditary. The conformation in which spavins are most often found, is the narrow hock; too much cut out under the hock, sickle hocks, too wide conformation, and in which the horse stands too far back with the hind feet.

Defective hocks should be considered among the worst faults in a horse. Weak hocks, curbs, and spavins have often been observed in whole families. For these reasons the hock should receive the most careful consideration in an examination of horses for any purpose. Sires or dams with weak hocks, especially so if they show curbs or spavins, and families in which this fault exists, should be rigidly excluded from the breeding ranks.

In those cases in which curbs or spavins develop at an early age, before the horse is put to hard work, breeding should not be permitted. Yet it does not seem just to establish a law that would exclude from breeding all horses that have spavins or curbs. When such unsoundnesses are developed after maturity, and especially if it can be shown that the conditions are due to injury or excessive strain and that the animals are from good families, are of the proper type, and have good conformation, they should not be condemned.

Of 813 stallions examined by the Australian commission, 17 were rejected for bone spavin, 5 for bog spavin, and 11 for curbs. In the number examined, 358 were draft horses, and 270 light driving horses. Of the draft horses, 3 were rejected for bone spavin, one for bog spavin, and none for curbs. Of the driving horses, 13 were rejected for bone spavin, 4 for bog spavin and 6 for curbs. It does not state whether any consideration was given to conformation or age. It is presumed that they were rejected for these faults regardless of cause.

When considering the subject of ringbones, many reasons will be observed why horses afflicted with them should not be condemned indiscriminately. Ringbones may be caused by faulty shoeing, strains, or traumatisms, and, if so, the horse having them should not be excluded, especially where the animal has good conformation and other desirable qualities.

Ringbones, as spavins, are looked upon as serious defects, and, like them, may be due to a faulty conformation, and in this case the horse should be condemned. Long, thin pasterns, or very short, stiff, upright pasterns and the base wide, base narrow, toe wide, and toe narrow conformations are defects that predispose to ringbone, and conformation of this type is pretty sure to be transmitted. Horses with such faults should be excluded whether ringbones are present or not. Horses that have developed ringbones before maturity or before hard work has been done should also be rejected.

Of the stallions examined for a license in Australia, 8 of 358 draft horses and 3 of 270 light driving horses were condemned for this reason.

Sidebones are conditions in which the lateral cartilages of the foot become ossified either partially or completely. Heavy, coarse bred horses are especially predisposed to develop them. They are seldom seen on the hind feet. The left front foot is more often affected than the right and the inside cartilage less often than the outside one.

Lungwitz, who examined 1,251 horses, found 144 of them affected with sidebones as follows:

Of 98 Belgian Cart Horses, 68 had sidebones.

Of 120 Danish Carriage Horses, 25 had sidebones.

Of 388 Heavy Riding Horses, 36 had sidebones.

Of 132 Other Heavy Riding Horses, none had sidebones.

Of 133 Light Riding Horses, 8 had sidebones.

Of 140 Riding Horses of all sizes, 3 had sidebones.

Of 200 Military Horses, 1 had sidebones.

Of 40 Officers Horses, 3 had sidebones.

Of 1,251 Horses, 144 had sidebones.

Of 813 stallions examined by the Australian commission, 80 were rejected on account of sidebones as follows:

358	Draft Horses........	77 had sidebones
270	Light Horses........	3 had sidebones
185	Ponies	0 had sidebones
813		80

In answers to my circular letter, two correspondents would, and eight would not, reject horses afflicted with sidebones. The Australian commission has observed the transmission of sidebones from sire to sons and from son to grand-sons. In one case they examined twelve stallions from one sire and eleven of them were condemned for this defect. One of the best arguments in favor of the transmission of sidebones is the fact that in some whole families of heavy draft horses none are found.

When Veterinary Inspection was adopted by the Royal Shire Horse Society it was found that 33 per cent of the show horses had sidebones. They were found more common in the coarse Shire type than in the cleaner-boned Clydesdale.

There seems to be the greatest diversity of opinion among veterinarians in reference to sidebones. Some, among them Dr. George H. Barns, look upon them as very trivial defects and from observations made for many years on draft horses, especially, believes that a horse is but very slightly more liable to go lame with sidebones than without them. While according to others, a horse is liable to work sound on city pavements with ringbone as with sidebone.

Moller recognizes three principal causes. The first is a congenital predisposition in heavy, coarse-bred horses; the second is excessive concussion produced by work or hard roads; the third is due to shoeing with calks, by which the frog is prevented from taking any bearing on the ground and the lateral cartilages are subjected to a continuous, downward strain.

Horses with sidebones cannot be passed as sound for hard work on the city pavements. They are not infrequently seen on green draft horses, fresh from the country. While we must admit that many horses with sidebones are serviceably sound, yet a large percentage of them will go lame as a direct result of this defect or from secondary diseases of the hoof coming therefrom. It would appear that we are justified in condemning stallions for breeding purposes when sidebones develop before they have been shod or have done any heavy work on hard roads.

Very few of my correspondents expressed positive opinions in reference to the transmissibility of navicular disease. Dr. Edgar Powel mentions a mare that he owned and used for breeding purposes that he believed to have had this disease for twelve years. The diagnosis was not confirmed by post-mortem examination. She was bred to a Thoroughbred stallion once and four times to a Hackney. Most of the colts were unusually good. Two, at least, were show horses. All of them developed into sound saddle and harness horses, worked hard and none of them ever showed a symptom of navicular disease. On the other hand, equally convincing cases that showed a hereditary tendency were cited by other veterinarians. It may require months to make a positive diagnosis of navicular disease and it is then best completed by an autopsy. The condition is practically incurable, and in advanced cases neurotomy is the only means by which the animal's usefulness may be prolonged.

Cadiot reports that out of 403 horses brought to the Alfort clinic from 1896 to 1897, 108 were suffering with different affections of the feet and navicular disease was diagnosed in six. Probably about one per cent of a veterinarian's practice will be navicular disease. Contracted sole may show practically the same symptoms and is often associated with it. Contracted sole is curable in uncomplicated cases and the animal can be restored to soundness. The Australian law does not list navicular disease as transmissible.

It is most often seen in well-bred horses; in draft horses, seldom, and it appears usually in the front feet, and most often in horses with deep, steep contracted heels, yet it is often seen in feet of the best conformation and has been found in the hind feet.

The causes mentioned by Moller are heredity, traumatisms and metastases. As matastatic causes, diarrhoea, various general infections as strangles have been suspected. Direct violent traumatisms may play a small part in the production of the disease but the usual cause is the traumatism of wear; the pounding and strain of hard work.

The pathology of the disease is fairly well understood, but as to cause, prevention and treatment, there is still much to be learned.

It would appear just to condemn, for breeding purposes, horses afflicted with this disease where it has developed from small cause, where it is of long standing and both feet are affected.

Osteoporosis is one of the listed hereditary unsoundnesses in the Australian law. From observations made in this country, it could not be so considered. Many cases sent to the country recover, and so far as could be learned, no outbreaks have occurred in sections to which such cases have been sent.

Several bad cases of big head in fillies were sent to Mr. Henry Fairfax, in Virginia, from near Philadelphia. All made a complete recovery by the time they were five years old. They were regularly bred, and the disease never appeared in their colts on the farm.

If Osteoporosis is due to infection or malnutrition, as many investigators believe at present, there is no reason for considering it hereditary. The evidence is, however, strong in favor of the theory of infection, and warrants breeders in isolating or destroying well marked cases.

The following quotation from an article written by M. J. Basset, of the Alfort School, and printed last year in the Recueil de Medecine Veterinaire, on the subject of "Osteomalacia," will show the opinions held in reference to big-head in Europe. It is as follows: Osteomalacia is common in man, horse, ox, goat, sheep, swine, dog, rabbit and rat.

The disease is known by various names which change with investigators according to the way that the symptoms and alterations strike their fancy. The term "Osteoporosis" implies that after macerating and drying the bone is porous and light. "Osteomalacia" implies fragility of the bones or that they break easily. "Osseus cachexia" is a state of profound misery in which the patient is not able to take the necessary amount of nourishment. In swine, it is known as gout or foot disease. "Sniffles" is a term often applied to it in swine when the nasal cavities are restricted by the increased thickness of the vomer and the other bones of the head which restrict the air passages and cause loud breathing.

In horses it is sometimes called "Bran Disease," because it develops often in Switzerland and Germany in millers' horses, which are fed freely on bran.

We prefer the term "Osteomalacia" because the partial or total softening of all the bones of the body described by the first observer, is always present. We believe that it is logical to reserve this ancient designation until the true cause of the disease is discovered and it can be given a more precise and suitable name.

The list of predisposing causes is rather long. One finds, as in all infectious diseases, circumstances for diminishing the resistance of the organism. The determinate cause of osteomalacia is still unknown. The solution of the problem should appear soon for the reason that Mousau has reproduced the disease experimentally in swine and goats. Mousau and Charrin have reproduced it in a rabbit. This was done, says Mousau, either by co-habitation with an affected animal or by the subcutaneous inoculation of the bone marrow during the beginning or the active period of the disease.

In a preliminary communication to the Academy of Medicine of Turin February second, 1906, Morpugo gave the results of numerous experiments on young and adult white rats. In these experiments which were begun in 1898 and partially reported in diverse publications, the author produced the disease at will, either by co-habitation or by inoculation of germs supposed to be diplococci isolated from subjects that were affected with the disease. Observations are numerous, which indicate clearly the infectious nature of osteomalacia.

In 1874, Paul Bouley summed up the many observations on the subject of osteomalacia in man and domestic animals. He wrote, at that time, that the only therapeutic proceeding that had rendered service was emigration from the place where the disease developed or removing the animal to a richer locality. It is now known that the richness of the soil has nothing to do with curing the disease. Captain Robertson, in an article on "Osteoporosis," in the Veterinary Record, says in reference to affected horses, that they recover by simply removing them from the infected district without even changing the food. No treatment is effectual except a complete change of location. He cites a village where it was proven that the disease was imported by a race horse. Pecaud cites a similar case. At one time the disease was recognized only in the State of Dape Cau, Indo-China. The afflicted animals were sent to Sontay where they improved or recovered. For the past three years Sontay has been badly afflicted with the disease.

In the regions where the disease is epidemic it has been attributed to the soil, climate, etc. At times droughts or too much humidity may play a part, yet the disease is not found alone under these conditions.

No information was received on the subject of deafness.

The following is an interesting instance of inherited unsoundness: The black mare "Ebony Bell" made a few sensational appearances in the show ring. She developed suddenly a severe lameness in the near hind leg, at the Philadelphia Show. The condition was considered as a light attack of azoturia. She recovered fully in a few minutes, but developed the same condition in her next show appearance, which was at the Garden, the following fall. Again the veterinarians diagnosed azoturia, and horsemen called it "kidney shot." She was retired from the show ring, but would develop the same peculiar lameness whenever she was exercised. She was bred two years, and not driven or ridden during the time. She had two foals which developed the same character of lameness soon after being broken. The writer suspected stenosis of the external iliac artery in the dam, and by a rectal examination verified the diagnosis. She was then destroyed. The diagnosis of stenosis in the case of the foals was made by the history alone. It would appear that the trouble in them was plainly due to hereditary causes.

Light bone, faulty attitude of the limbs, low back and weak coupling, are faults of conformation. There can be no question but that defects of this character can be transmitted. Breeders should not use such animals. Stallions with these defects should be classed as nondescript specimens, and those that do not possess true race characteristics, are off type, etc., should be prevented by law from service in the stud.

Contracted feet may be the result of bad care or improper shoeing, and, if so, would not be transmissible. Where it is known to be a family characteristic or a congenital defect, it is looked upon as transmissible.

Cryptorchids and monerchids are usually spoken of as ridgelings. There is difference of opinion among breeders in reference to this condition being transmitted. The operation of gelding them is not well understood by the average castrator and fatalities are more common than in the normal operation. For this reason breeders should consider the advisability of using ridgelings.

The true cause and pathology of stringhalt, shivers and crampiness are not known. Stringhalt is sometimes seen with spavin or a defective hock, and if so, should be rejected. No cases were reported where sires or dams with these defects were bred and no opinions were given in reference to their transmissibility.

It is hoped that the study of hereditary diseases will receive more united study in the future. This question should interest breeders and veterinarians. Our profession will be called upon in the future, more than in the past, to give opinions in reference to it.

Stallion laws are beginning to be recognized as necessary and wherever they have been intelligently enforced there is a marked improvement in the type and character of horses.

A nondescript brood mare can do but little damage compared to the harm that such a stallion may cause in a breeding district. The ideal horse should be free from defects of all kinds, but great injury or injustice would result to the breeding industry if only such perfect animals were allowed to breed for the reason that there are so few perfect animals. To know how far one can safely go in overlooking defects is a difficult question. If we had true statistics on all that might be known in reference to the subject we would be better prepared to make laws and regulations for the future. We would attempt in all possible ways to collect true facts on this important subject.

In the meantime, laws disqualifying horses from breeding on account of unsoundness should be conservatively drawn. The following is the Pennsylvania statute of 1907 on this subject:

"Stallions afflicted with hereditary, contagious, or transmissible unsoundness, or disease, may be refused license by the State Live Stock Sanitary Board; and when license is so refused, the said stallion shall not be used for public service or profit or gain in this State. Provided, however, that a license may be refused under this section, only when it is certified to the Board by the State Veterinarian that the stallion in question is afflicted with an hereditary, contagious, or transmissible unsoundness or disease of such a nature, or that the abnormal condition is accompanied by such a defect of conformation as to render it probable that the progeny of the said stallion will be specially liable to said unsoundness or disease. Blemishes and deformities due to accidents shall not be regarded as unsoundness, within the meaning of this Act."

After the reading of this paper, Mr. Powell again took up his report as follows:

You will notice that we have recommended nothing, so far. After giving full consideration to the matter, and also consulting with a good many others, we have come to the conclusion that the law be so amended that the defects be covered in the certificate. At the present time there are men in every county who, under cover of the State license, are doing much to continue hereditary unsoundness in horses. Any one who has given any observation to the matter, knows that this is so. In our conservative report, we would simply recommend that the certificate set forth what these unsoundnesses are, and then let the breeder draw his own conclusions as to whether he wants to breed to these defects, or not.

Now, there are defects that are the result of accident, but are of very little account, and there are others that are of very great account. Just a little instance from my own experience: We had a horse, a very valuable one, with as good eyes as I have ever seen. By accident, one of the boys struck him in the eye with a whip. We paid very little attention to it, but to our great surprise, the colts born during that period all had defective eyes. We have investigated back for several generations, but can not find that any of his ancestors had ever shown this defect. This is one of the things that we must take into consideration, and must educate the people up to.

There is one thing that you will notice in the report there; the Doctor spoke of what kind of hocks are likely to produce spavin, and so on. How are you to guard against them? It becomes a matter of judgment; it cannot well be described. Horses have the same individuality as man, and every man has his own individuality. When I meet our President, I know him. Can I tell you how I know him? You know him when you see him, but can you tell me how I will know him when I meet him? What we will say is that he is a good-looking man, about such an age and size, very agreeable to speak to; but it does not cover the individuality; we must learn that by practice. So it is with horses. We must learn to judge them by practice.

We have given this matter no little consideration, and you have our report, most respectfully submitted.

President Norton—Gentlemen, you have heard that report. Won't some one move that it will be adopted?

Dr. Gay—Before the report of the committee is adopted, I would like to ask Mr. Powell a question. Do I understand that you would cover every case of unsoundness by simply publishing on the certificate what it is?

Mr. Powell—In every case, absolutely.

Dr. Gay—And not disqualify that horse?

Mr. Powell—If the horse is so faulty as to be disqualified, a commission should be appointed to investigate that matter. The Veterinary Department should authorize a committee to report on that point. Then, a man whose horse has been reported unsound by a local veterinarian has the same right to appeal to the commission.

Does that cover your question?

Dr. Gay—Yes.

President Norton—Will some one make a motion that the report be adopted?

Mr. Cowan—I move that this report be adopted.

Mr. Palmer—I second that motion.

The vote was carried in the regular way, and the report of the committee on Hereditary Unsoundness adopted.

President Norton—Now, I think this report should be discussed, but I believe it will be well to wait until we have heard Dr. Gay. Dr. Gay will now talk to us on "The Pennsylvania Stallion Law."

Mr. Bayard—Before Dr. Gay begins his speech, I want to announce that the corn will be sold immediately at the close of this session. We want you all to stay; you can't afford to miss it; you will all have a chance to bid on it, and secure some of the prize ears.

Dr. Gay then spoke as follows:

THE PENNSYLVANIA STALLION LAW

By Dr. Carl W. Gay

Gentlemen—I have advertised the Pennsylvania Stallion Law up one side and down the other, until it seems like an old story, and I hesitate to say any more about it, but for that very reason it does seem desirable to say something about it after a year of operation, and at the request of Mr. Norton and Mr. Bayard, we will take it up for your discussion.

Stallion laws have been passed in this country by Wisconsin, Minnesota, Utah, Iowa and New Jersey, and now Ohio and Kansas are adopting the same thing, and I happen to know that Indiana will not be long in falling into line.

So far as the operation of the law has been concerned in this state, perhaps you have heard criticism after criticism made, and there are some things in the law that require amendment, and they will be amended by the people of Pennsylvania.

Now, I have had the opportunity this past year of getting at this law from various view-points—from the point of view of the men who were responsible for its enactment—from the point of view of the men who were responsible for its enforcement, and, lastly, and most important, from the mare owner's point of view. In these views I find certain criticisms that I have already referred to, and I think they come from two sources.

There are two classes of stallion owners; the first are the men who own good horses. They commend the idea of the law, but they claim it does not give them the protection they should have, and with that criticism I sympathize. The other class I cannot sympathize with; they are the men who are pinched by the law. They are men to whom the law has permitted the opportunity of standing their horses for public service, and they have no just cause for complaint.

Now, in regard to this report of the committee, I would say that it meets with the entire approval of the Department. The report was referred to the Veterinarian before being presented, and has the entire approval of that Department. I know something of this committee and their work. Some of you may be surprised that they do not specify unsoundness, but there is so much latitude in that, so much difference in opinion as to what really constitutes unsoundness, that I think they have very wisely recommended stating in the certificate what particular form of unsoundness the horse is suffering from, and then leaving it to the breeder's option whether to breed to him or not. Nearly all the States agree as to what really constitutes unsoundness, they all have practically the same list. Iowa is unique in that it does not refer at all to unsoundness.

My observations have led me to believe that we are not justified in raising a certain list of diseases as disqualifying a horse absolutely. There may be cases which would come under the list, which would absolutely not affect a horse from a breeding standpoint, and there are other things besides soundness that make a horse good. We should do nothing to discourage horse breeding in this State. In a general way, I should say disqualify every form of unsoundness, but you take all the horses in Pennsylvania, and you will find that very few of them are entirely free from one form or another of unsoundness, and in disqualifying these horses for some form of unsoundness, you are disqualifying some of the best horses in the State. In spite of the fact that they have some form of unsoundness, included in the list named, they are getting a better class of colts than many of the horses that are absolutely sound and pass all the requirements of the law.

The reason I asked Mr. Powell this last question is that I think this a matter for the mare owner. I believe that the mares should have all needed protection, but I still think one of the important things is to discourage breeding, and there is a great deal to do in that line. Nondescript stallions are represented as pure, and unsound ones are represented as sound, and the first thing we have to do is to educate the public up to a knowledge of type and conformation and the importance of pure blood, and to get them away from the old mongrel.

Now, I believe that in order to accomplish something along that line, we have to do more than disqualify the horse for unsoundness. The certificate clearly states that the horse is pure-bred or grade, and if the recommendation of the committee is carried out it will state in what particular form he is unsound, and leave to the option of the mare owner whether to breed to him, or not. But it seems absolutely necessary to disqualify some horses, and for that reason I would not accept the report of the committee as it was first made. It is absolutely necessary to disqualify some horses to overcome the harm they might do. Even then, I believe, it is better to merely state his unsoundness than to disqualify him altogether. It is so hard to decide positively this question of unsoundness in sires, and so long as the least uncertainty exists, I don't believe I would disqualify such a horse altogether. So long as we cannot specify any definite unsoundness, I think you will agree with me that it is not to the best interests of all concerned to absolutely disqualify them, and I think we will find better horses in Pennsylvania ten years hence if we do not disqualify them than if we do. I am not advocating an unsound horse, but I know the class of horses that are being bred in this State, and I think if these horses are passed over into Ohio or Indiana because we disqualify them in Pennsylvania, that Pennsylvania will be the loser.

You have, perhaps, been reading about the Stallion law in New Jersey. Now, I happen to know that the conditions over there are different. In New Jersey they have very little desirable blood. In Pennsylvania we have just as good blood as you will find in any State. I will pick you out two counties in this State, and anybody who knows anything about any county in any State in the Union, will agree with me that they breed just as good coach horses in these counties as they do in any State in the Union, and we have the same class of horses in other breeds throughout the State, and unless the men who breed these horses are protected by law, they are certainly not going to do it. You will find the stallions here to produce good blood, and we have reached the point where it is necessary to educate the mare owners up to a good sire, and then go a little farther and take away from them a certain class of sires that are absolutely detrimental to the horse breeding interests of the State.

Now, I don't care to talk too much about this. I have talked about it and written about it until you must be tired hearing it. Last year the law was pretty much in prospect. Now, we have had it in operation about a year, and have had a chance to see how it works. There are some cases where the law has been violated, and horses were misrepresented. For instance, we have known a certificate to be altered in regard to the age of the horse it described. In another case the little word "not" was taken out —of course by "printer's error!"

Then, there has been another class of men who have been careless in the matter of pedigree registration. They have come along with a "somebody said so," expecting to get a pure-bred certificate, but, on the whole, if you were to ask Knight of the Trotting Association and Glenn of the Percheron Association, you would find that they made a good many more registries this year than last.

Then, there is another thing of note, and that is: the number of horses coming into the State. A new draft horse came into Mercer County this week, I understand, and one came into Chester—Delaware County—an excellent horse; another one into New Castle. Within the last few months a large number of fine horses have come into the State. Now, it seems to me this is a mark of confidence. These men began to think they had some protection, and went out and made these purchases, and I believe that when you take these things into consideration, you must admit that this has been an improvement.

Mr. Hutchison—How do you know that these horses in Delaware and Mercer are good horses until they are tested?

Dr. Gay—I will tell you, Mr. Hutchison; that is a very important point. We have never seen a colt from any of these horses, and we don't know until we try them, but we have every indication that will give us confidence in them as sires, although we don't know anything about a horse until we try him. This Commission Mr. Powell spoke about would constitute a Court of Appeal, and they would be well fitted to take up cases of this kind, and look after such a horse, and see whether he is good.

President Norton—What would you say about the Commission examining all stallions?

Dr. Gay—Every one, or only those that are to be tested?

President Norton—Every one.

Dr. Gay—My idea exactly. We can do it. There is a vast difference between a man's own idea of what constitutes a good horse, and what really does constitute a good horse. I have seen horses all over this State which their owners thought were good, and when my opinion was asked I was ashamed to give it. And yet these horses came within the limits of the State law, and we could not refuse them certificates. It seems to me that the whole matter is a matter of arbitration. Each man may have his own idea, but let the matter be settled by a Commission, and there can be no question. I have known men to testify to one horse as unsound, and then call another horse sound that was a hundred times worse. If you can get one commission to pass on all stallions, it would be along the same line as New Jersey. There they have only twenty-one counties against our sixty-eight, but I think it would be the best thing anyhow; it would finally settle all disputes on the question.

Mr. Van Norman—Can't you offer some inducement for a Voluntary Commission?

Dr. Gay—We have tried in every way to think of a plan to do that that would go through. And then the trouble would be lack of uniformity. This lack of proper classification is one of our greatest drawbacks. For a horse to be in the wrong class is just the same as if he had no breeding whatever.

President Norton—Don't you think it would let down the bar to the grade stallion?

Dr. Gay—Mr. Norton and I understand each other. As I said before, I do not think it advisable to weed out the good grade until you have pure-bred horses up to the standard of the good grade.

Mr. Van Norman—How do you understand it is a bar to grade or pure-bred?

Dr. Gay—I think that is a matter of limitation in the pure-bred as well as in the grade. Secretary Dunlap has one of the best horses in the State, and he was ineligible for pure-bred. I know another one in Crawford, one of the best horses in the State, but, good a horse as he is, I am not in favor of grade breeding. Let us go to breeding good, sound horses, and in time we can eliminate the grade—or he will eliminate himself. as the public becomes educated up to the advantage of good sires.

Mr. Gooderham—I would like to ask the Doctor whether he thinks it would not be possible to have a committee appointed, and have the stallions all meet in one or two places in each county at a particular time and then have the Commission meet the owhers there and save expense?

Dr. Gay—It certainly is entirely feasible, and it has been suggested, but the objection has been raised that some of the stallion owners would have to go twenty miles. Another plan that has been suggested is to have a Fair and have the Commission meet the stallion owners there. Of course, it would be impossible to have a man in each county, but it would be possible to have three men who would go over the State, and I believe that if you would centralize your horses at a given point at a certain time, the State would take care of the Commission.

Mr. Van Norman—They could issue a first grade and a second grade certificate.

Dr. Gay—That is very true; but it would probably be a little hard to distinguish between the two.

Mr. Van Norman—I would have the second grade put in red ink.

Mr. Norton—I want to thank the Committee for the good work they have done, and then, if there is nothing more, we will adjourn to meet at half past nine tomorrow morning. Tonight we will be glad to have you all at the banquet at the Lochiel at nine o'clock.

Prof. Van Norman—We have the proper badges for the banquet, and I have the tickets for those who have the price.

Mr. Bayard—No adjournment until this corn is sold. Stay where you are. Prof. Burkett will act as auctioneer for the prize ear, and you will all have a chance to bid on it.

ADDRESS OF PROF. BURKETT

Ladies and Gentlemen: I am glad to take part in this great corn improvement in Pennsylvania. I was not born in Pennsylvania, but I was born just a little ways off, in another State. I have had the pleasure and privilege of taking part in a good many corn shows. I used to be out in Kansas. One time there I was introduced as coming from Ohio, and the toast-master, intending to be complimentary, said when I came from Ohio to Kansas it was an improvement and a help to both States.

Now, any one knows that Pennsylvania can grow corn. The speakers this afternoon have been telling us about horses. Now, this Breeders' Association knows the value of good blood horses, and they want to see this good blood in men, and in animals, and in corn. I fear when it comes to farm crops we have not paid very much attention to blood. The price we have paid for corn heretofore shows that. Out in Kansas they sold some prize corn, and they ran it all the way from $300 down to $10. You may say that no ear of corn is worth three hundred dollars, but you think nothing of paying from a thousand to fifteen hundred dollars for a pure-bred animal, and we should get a proportionate price for a pure-bred ear of corn. When it comes to corn, we are like the man who took half interest in a hog for $56—

A Member—"Which half?"

Prof. Burkett—The front half, and that was the smallest part, too. We are apt to buy corn without discrimination. Now, we can work up a pedigree in corn as well as in other things. Now, take this prize ear. It is a beautiful specimen. I have taken part in a good many of the corn shows of the West that we hear so much about, but I have never seen better corn in my life than has been grown right here in Pennsylvania. The Western States have no such yield of corn per acre, as has the great agricultural State of Pennsylvania. We have a higher yield per acre in this State than in many others. What do the reports of the Department of Agriculture say? For the entire State the yield is 38 bushels per acre. Why, Illinois, the great corn State, had an average yield this year of only 31 bushels per acre; and then say there is nothing in corn in Pennsylvania!

I did not come here to talk, however, and I only want to say that we have not placed the proper standard upon wheat and oats and corn, and things of that sort in this State. Look at this prize ear of corn. It has pedigree and blood and breeding. It has been carefully selected for many years, and these features have become uniformly set in it, and it has become the Champion of Pennsylvania. If each grain is taken and grown, this ear is worth at the lowest figure a thousand dollars. I don't expect to get that amount for it, but I do expect to get a good sum for it. Of what variety is it?

Mr. Bayard—Funk's Yellow Leaming.

At this point the bidding began, and the corn was sold to the various bidders, after which the session adjourned until Friday morning.

Friday, January 29th, 1909.
9.30 A. M.

Mr. Norton in the Chair.

Mr. Perham—Mr. Norton will read the report of the Nominating Committee of the Dairy Union. This matter was left in Mr. Norton's hands because it seems that they have nominated practically all the old officers.

Mr. Norton thereupon read the report of the Nominating Committee of the Dairy Union as follows:

For President, W. E. Perham, Niagara, Pa.; Vice President, J. G. Reist, Mt. Joy, Pa.; Secretary, H. E. Van Norman, State College, Pa.; Treasurer, W. D. Marshall, Lyndell, Pa.

Directors—G. M. Carpenter, Wilkes Barre, Pa.; E. E. Jones, Harford, Pa.; H. B. Richards, Easton, Pa.; M. P. Shoemaker, Greensburg, Pa.; D. R. Stevens, Sayre, Pa.; P. P. Gheen, Willow Grove, Pa.

Representative on Executive Committee of Allied Agricultural Organizations—L. B. Henson, Coatesville, Pa.

On motion, properly seconded, and duly carried, the report of the Committee on Nominations was adopted, and the Secretary instructed to cast the ballot for the officers as named.

Prof. Van Norman—As instructed, I cast the ballot for the officers as named by the Committee on Nominations.

President Perham—Is the Committee on Resolutions ready to report?

Prof. Van Norman—I have the report, but the members of the Committee seem to have all succeeded in getting away.

Prof. Van Norman then read the report of the Committee on Resolutions of the Dairy Union, as follows:

Report of the Committee on Resolutions of the Dairy Union

WHEREAS, with the present funds and means of support, the Dairy Union cannot do its best work,

RESOLVED: That the Secretary of Agriculture, Hon. N. B. Critchfield, be requested to include in his budget an appropriation of $1,000 per year for the next two years, for the work of the Dairy Union.

President Norton—I move that the Resolutions be adopted in sections, as read.

This motion was properly seconded, and carried in the regular way, and a vote having been taken on the Resolution just read, it was adopted.

Prof. Van Norman then read the second Resolution, as follows:

WHEREAS: The Dairy division of the United States Department of Agriculture has done so much to make our meeting a success by the addresses given by Acting Chief Lane, and the scoring of the butter by C. W. Fryhoffer, of the Department, be it

RESOLVED: That we hereby tender our thanks to the Secretary of Agriculture for the efficient aid rendered by these men.

This Resolution was adopted in the regular way, after which Prof. Van Norman read the next Resolution, as follows:

WHEREAS: Secretary Critchfield of our State Department has co-operated with our Dairy Union, and assisted materially in making our meeting successful,

RESOLVED: That our thanks are hereby tendered to him for this assistance.

This Resolution was also adopted in the regular way, after which Prof. Van Norman read the next one:

WHEREAS: Dr. Leonard Pearson, State Veterinarian of Pennsylvania, together with the officers of the Federal Government, has done effective and heroic work in stamping out and preventing the urther spread of the Foot-and-Mouth Disease in our State.

RESOLVED: That the members of the Dairy Union hereby tender their thanks to Dr. Pearson and all who aided him in this work for the efficient work they have done, and the effective way in which the whole matter was handled.

This Resolution was unanimously adopted, after which Prof. Van Norman read the next Resolution, as follows:

WHEREAS, the meetings which have been held in conjunction with other livestock and agricultural organizations have been more successful than when held alone, and insure a larger attendance,

RESOLVED: That we recommend the holding of joint meetings whenever it is possible to do so.

(Signed) T. D. HARMAN,
W. D. MARSHALL,
O. D. MOTT,
C. W. LARSON,
Committee on Resolutions of Dairy Union.

President Norton—I was asked to request you people to bring up a Resolution requesting the National Dairy Show to meet in New York at its next session. This Resolution is as follows:

WHEREAS, The Dairy interests of the Eastern States are a leading feature in our Guild, and an immense number of people cannot go to Chicago, therefore be it

RESOLVED: That this Association urges the National Dairy Association to hold its next annual show in New York City.

A copy of this Resolution to be presented to the National Dairy Association at their annual meeting in March.

This Resolution was also adopted in the regular way.

President Perham—Any other matters to come before the Dairy Union this morning? Is the Committee on banquet ready to report?

President Norton—We have not settled the bill at the hotel yet, but I think we will come out just about even. We were afraid yesterday that we would have to reach down into our pockets, but we will not have to do that, although there won't be enough left to get a drink on.

President Perham—Before the Dairy Union is through, is the Auditing Committee ready to report?

The report of the Auditing Committee is as follows:

"We have gone over the accounts, and found them correct, as reported."
(Signed) E. B. NOLL,
H. J. HARRINGTON.

President Norton—Is the Auditing Committee of the Breeders' Association ready to report? If not, we will receive the report of the Committee on Resolutions in the meantime.

By request, Prof. Van Norman read the report of the Committee on Resolutions of the Breeders' Association, which is as follows:

Report of the Committee on Resolutions of the Live Stock Breeders' Association

On motion, duly seconded and carried, these Resolutions were adopted section by section, as read.

RESOLVED, That the sale and use of tuberculin should be regulated by law, in such a way that fraud from the improper employment of this valuable diagnostic agent will, so far as possible, be prevented.

RESOLVED: That the work of the State in relation to cattle and dairy inspection should be conducted only by trained men, who are chosen with reference to their knowledge of these subjects.

RESOLVED: That we commend the work of the Veterinary Department of the University of Pennsylvania, and we recommend that a sufficient appropriation be made by the Legislature to this Institution, so that it may more adequately meet the needs of the State in the fields of Veterinary research and education.

RESOLVED: That we recommend the immediate passage of the bill to appropriate $90,000 to the State Live Stock Sanitary Board for the payment of necessary expenses in the eradication of foot-and-mouth disease, and for the control of dangerous, contagious and infectious diseases of animals.

WHEREAS: There is annoying lack of uniformity in the manner of reckoning ages of animals for exhibit at our State and National Fairs, therefore be it

RESOLVED: That this Association, through its Secretary, request the National Association of State Fair Secretaries to adopt uniform rules of computing age of cattle; and, further, that we recommend August 1st as the test date.

WHEREAS: The work of the Pennsylvania Live Stock Breeders' Association is a legitimate part of the efforts to advance the agricultural interest of the State, therefore be it

RESOLVED: That the Pennsylvania Live Stock Breders' Association do ask the Secretary of Agriculture, Hon. N. B. Critchfield, to include in the budget of his Department an item of $2,000 for the legitimate work of this Association during the next two fiscal years.

WHEREAS: The State of Pennsylvania should have a great State Fair, such as is held in other states of equal agricultural importance, with the object of bringing together everything of intrinsic value agriculturally, therefore be it

RESOLVED: That each and every member of this Association use his efforts and influence to secure the passage of a bill, at this session of the Legislature, which will make possible a State Fair commensurate with the Live Stock and Agricultural interests of Pennsylvania.

WHEREAS: In the opinion of this Association, the educational value of exhibits of improved live stock justifies every reasonable concession to the exhibitor; therefore be it

RESOLVED: That this Association request the Pennsylvania Railroad and other railroads to make such changes in their rules as to "Exhibits" as to make the rate of freight one-half the regular rate from the point of origin to first point of exhibit, and thence to each subsequent point of exhibit, until the final one shall be reached, and thence direct home from the final point of exhibit, to the point of origin. This is to apply only on registered horses (other than race horses), cattle, sheep, goats and swine, moving for exhibition purposes, and upon presentation of the usual certificate of registry, to the carrier's representative at each point of shipment. One attendant to accompany each less than carload, and two attendants to accompany each carload free, for the purpose of feeding, watering and caring for such shipments while en route between the points specified.

WHEREAS, The State Live Stock Sanitary Board has done most efficient work, especially in the prompt handling of the Foot-and-Mouth Disease outbreak; therefore be it

RESOLVED: That this Association transmit to its Secretary, Dr. Leonard Pearson, this expression of our appreciation of the work of himself and his colleagues.

WHEREAS, The Dairy industry is the leading one in most of the Eastern States, including Pennsylvania; therefore be it

RESOLVED: That this Association urge the National Dairy Show Association to hold its next show in the East, and further, that our members make known to the Show Association their wishes to cooperate to this end.

WHEREAS, The Secretary of Agriculture of Pennsylvania, Hon. N. B. Critchfield, has done much to make possible the success of these joint meetings; therefore be it

RESOLVED: That we, the Pennsylvania Live Stock Breeders' Association, extend to him our hearty appreciation of his efforts.

(Signed) H. E. VAN NORMAN,
CARL W. GAY,
J. E. DODGE,
Committee.

President Norton—Next in order is the report of the Nominating Committee of the Breeders' Association.

Mr. Powell—The Nominating Committee beg to offer the following as their report:

For President, Hon. W. C. Norton, Waymart; Vice-President, Dr. Leonard Pearson, Philadelphia; Second Vice-President, M. P. Shoemaker, Greensburg; Secretary, E. S. Bayard, Pittsburg; Treasurer, J. F. Lantz, Wyebrooke.

Executive Committee—W. G. Powell, Shadeland; M. N. Clark, Claridge; D. Norman App, Selinsgrove; Lee R. Scott, Burgettstown; Henry Fielden, Devon; James Blair, Hartstown.

Legislative Committee—Hon. W. C. Norton, Waymart; E. S. Bayard, Pittsburg; Dr. Leonard Pearson, Philadelphia; Dr. Thomas Turnbull, Allegheny; H. W. Comfort, Fallsington; R. L. Munce, Canonsburg; J. H. Reichert, Scranton; S. E. Nivin, Landenberg; Henry Palmer, Avondale.

Transportation—T. D. Harman, Pittsburg; Dr. J. Cheston Morris, Philadelphia; W. F. Shrum, Adansburg; James T. Fleming, Belleville; F. W. Levis, Chadd's Ford; W. W. Blake Arkcoll, Henry Fielden, M. E. Kerber.

Committee on State Fair and Fairs—Dr. Pearson, E. S. Bayard, J. E. Dodge, F. W. McCoy, W. C. Black, James Blair, J. L. Henderson.

Submitted by the Committee,
W. T. POWELL,
M. N. CLARK,
R. L. MUNCE.

On motion, properly seconded, and duly carried, the report of the Committee was unanimously adopted, and the Secretary instructed to cast the vote.

In the absence of the Secretary, Prof. Van Norman was instructed to cast the vote, which he did, electing the officers named by the Committee on Nominations.

President Norton—I appreciate the honor, and will try to do my duty the best I know how, but I want the help of every man in the State. I want every man to go into his own district, and work, and I believe we can get a State Fair; but we need the help of every county in the State.

Mr. Powell—I would say that we looked the whole thing over, and decided that it was better to let well enough alone. We find that we are quite content with the officers who have done so much for us.

President Norton—The next, I believe, is the report of the Auditing Committee.

Mr. Lantz—I would just say that the books were gone over last night, and Mr. Blair has taken a copy of the report. I expected that the Committee would be on hand to report this morning. I don't know who has the report.

President Norton—Mr. Blair has gone down to the Freight Agent of the Pennsylvania Railroad, with the Railroad Committee, and I don't know when he will be back. Suppose you give us an idea how the books stand.

Mr. Lantz—At the last audit, January 28th, 1908, there was a cash balance on

hand of	$346 65
Receipts during the past year	336 10
Total	$682 75
Expenditures during last year, which included printing, corn prizes, etc	631 18
Leaving a balance in the treasury of	$ 51 57

President Norton—I have no doubt that Mr. Blair is satisfied, but he is not in the room. What shall be done?

Mr. Palmer—I move the report of the Treasurer be approved.

This motion was properly seconded, and duly carried in the regular way.

President Norton—Any further business? If not, a motion to adjourn is in order.

Mr. Palmer—I move we adjourn.

This motion was properly seconded, and duly carried in the regular way, and the Convention adjourned.

THE WORK OF THE INSTITUTE OF ANIMAL NUTRITION OF THE PENNSYLVANIA STATE COLLEGE.

It is a fundamental principle of democratic government that the people, who pay the taxes, must ultimately pass judgment upon the use made of their money by those to whom they entrust its expenditure.

During the past ten years a considerable amount of the people's money, drawn chiefly from the national treasury but in part also from that of the Commonwealth, has been expended at The Pennsylvania State College in making rather abstract investigations in animal nutrition. The undertaking is a unique one in this country both in organization and as regards experimental methods and equipment. Beginning in 1898 with a proposal from the United States Department of Agriculture for co-operative investigation and the construction of special apparatus, the work has grown until at the present time it requires a staff of nine persons and utilizes a plant costing about $20,000, including the respiration calorimeter which as yet is the only successful apparatus of the kind for experiments on domestic animals. Originally a department of the Experiment Station, the Trustees in 1907 recognized the importance of the work by constituting it a separate department of the College under the name of The Institute of Animal Nutrition.

It is altogether proper, then, that the people should ask what returns they are getting, or are likely to get from their money thus expended. Moreover, while this work, supported by public funds, belongs to all the people and is paid for by all the people, nevertheless, since it is undertaken for the promotion of agriculture, it is practically the farmers who must pass upon its value. I welcome, then, the opportunity to make to this representative gathering of Pennsylvania farmers and stockmen some plain statements regarding the work of the Institute of Animal Nutrition. In doing so, you will not expect me to go into the details of scientific methods or results. The farmer is not and does not pretend to be a scientist. The scientific man who is seeking to serve the farmer is obliged by the nature of the case to demand of the latter a certain measure of faith. He is compelled to ask the farmer to take his scientific abilities largely on trust, and on the basis of that trust to give him, sometimes in large measure, time and money to work out his results, believing that a scientific principle once established is, as all experience shows, sure to work out into beneficent results in practice and in the long run to far exceed in value those more obvious results, like an improved variety, a cheaper scheme of fertilization, or a new remedy for a destructive insect, whose immediate utility is more apparent.

That the farmers are willing thus to trust the scientific man is clearly evident from the rapidity with which appropriations for scientific research in the interest of agriculture have grown of late years. It is all the more obligatory on the scientific investigator in agriculture, therefore, in view of this confidence, and since his ends are sometimes remote and his processes mysterious, to make it clear to the people, whose money he is spending, what the problems are which he is trying to solve and how this solution is likely to benefit the public. As I see it, he should be able to show three things:—first, that the problems relate to agriculture and are of some real importance; second, in a general way how he is trying to solve the problems; and third, that the solution of the problems is likely to be of practical advantage.

I hope to be able to show these three things with regard to the work of the Institute of Animal Nutrition.

Every farmer who feeds live stock of any kind is engaged in converting vegetable materials into animal products. As a good business man, then, he wishes to know how much product he may expect to obtain from a given amount of raw material. In other words, he desires information as to the relative value of different feeding stuffs for making beef, pork, mutton, wool, silk, etc. Moreover, he wishes to know how the economy of the process is affected by the kind of machines (animals) he uses and the conditions under which he runs them. The work of the Institute of Animal Nutrition is an attempt to aid in answering some of these questions. Its problems, therefore, are of a practical nature and of great importance, not only agriculturally but also in relation to the economy of production of human food.

The methods which the Institute of Animal Nutrition is using in the study of these problems are not fundamentally different from those which would be used by the practical farmer. If we want to know how much beef can be produced from a bushel of corn there is only one way to find it out—to try it. The difference between the farmer and the scientific investigator lies simply in the way in which they try it.

At first thought the solution of such a question would seem to be a very easy matter; one within the reach of any intelligent feeder and calling for no elaborate appliances. As a matter of fact, the experience of the last seventy-five years has shown that it is by no means as easy as it appears. The apparently simple method of feeding the substance in question and observing the results on the animals by means of the scales, while it has demonstrated many interesting and important facts, has not led to the establishment of general principles nor aided greatly in building up the science of feeding. Why this is so, it is not necessary to discuss here in detail, but in general it may be said that the principal difficulty is in determining accurately and in detail the real nutritive effect. The Institute of Animal Nutrition is simply trying to determine more exactly than is possible in the practical experiment just what the animal does with the different foods supplied to it, and how their utilization is affected by differences in the animal itself and in the conditions surrounding it. In other words, the Institute is pursuing a very practical end by methods which involve the use of highly elaborate appliances, but which, nevertheless, have the same logical basis as the simplest feeding experiment. While these methods are not the only ones which are adapted for research in animal nutrition, they are believed to be on the whole the best now available for the solution of the particular problems which are being attacked. The general nature of these methods may, perhaps, be most readily understood by considering the analogy between the animal and a machine.

Mechanically, the whole body of an animal is a very wonderful machine, but what is of peculiar interest in this connection is that the body is what the engineer calls a prime motor—that is, like the steam or gasoline engine it moves itself and may supply power to move other machines. In fact, there is in some respects a very close likeness between the animal body and what is known as internal combustion motors—i. e., those engines in which power is developed by burning liquid or gaseous fuel (gasoline, alcohol, producer gas, etc.) in the cylinder of the engine itself. Such an engine requires two things for its operation:—first, sufficient repair material to keep its working parts in running order; and second, a supply of fuel in proportion to the work to be done. Just these same two things are what the animal regarded as a machine requires—repair material and fuel.*

That the feed of the animal is its source of both repair material and fuel is sufficiently obvious. We do not need a physiologist to tell us that when an animal is deprived of food its tissues waste away and its fat is burned up in the effort to keep the bodily machinery in motion.

The repair material for the animal machine is the digestible protein and ash of its feed. These are the substances of which the working machinery of the body is composed, and the organism can no more produce them from the fats and carbohydrates of the feed than an automobile can manufacture repair material out of the gasoline supplied to it as fuel. But while a sufficient supply of protein to the animal body is indispensable the body, like a good engine, makes relatively small demands for repair material and requires chiefly fuel. It is this demand for fuel material and the means of supplying it which the Institute of Animal Nutrition is especially studying.

We can run an engine with various kinds of fuel. For the steam engine, e. g., we might use coal or wood or petroleum; for the internal combustion motor, gas, alcohol or gasoline might be employed. Similarly, we supply the animal body with a great variety of feeding stuffs from which it has to extract its supply of fuel, and even the materials which it actually burns up are of various sorts.

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*Of course, the animal, like the engine, requires proper shelter and skillful handling. We are considering here simply food requirements.

Fuel materials are not all of equal value. A pound of good anthracite coal, for example, is, other things being equal, about 14 per cent more valuable as fuel than the same weight of alcohol, while a pound of fat in the food has over twice the fuel value of a pound of starch. Evidently, it will greatly simplify comparisons of different feeding stuffs and rations as sources of fuel material to have some simple method by which we can learn not only the amount of fuel material which the feed contains but also the quality of that fuel. Such a basis of comparison is afforded by a study of the energy values.

Anything which has the capacity to do work is said to possess energy. Hence we say that the fuel of the engine and the feed of the animal possess energy, since they enable the engine or the body to do work. They hold this energy stored up in the "latent" or "potential" form of chemical energy. When they are burned in the engine or the body, this chemical energy is set free, part of it being converted into work and the rest escaping as heat. Plainly, then, the value of a fuel, or of a feeding stuff so far as it serves as fuel, depends, in the first place, on how much chemical energy it contains. This can be measured without difficulty by converting it all into heat, by burning the substance, and measuring the heat produced. Various units have been employed in measuring heat, but the one which seems best adapted for use in the study of feeding problems is the Therm. (Represented by the abbreviation T.)

A Therm is the quantity of heat required to raise the temperature of 1000 kilograms (2200 pounds) of water 1 degree Centigrade. A pound of good anthracite coal would produce heat enough to raise the temperature of about 3583 kilograms of water 1 degree C. Consequently, the chemical energy contained in the coal is 3,583 Therms per pound. In precisely the same way the amount of chemical energy contained in many feeding stuffs has been measured. The following are the results of a few such determinations.

Chemical Energy in One Hundred Pounds*

Timothy hay	175.1 T
Clover hay	173.2 T
Oats straw	171.0 T
Wheat straw	171.4 T
Corn meal	170.9 T
Oats	180.6 T
Wheat bran	175.5 T
Linseed meal	196.7 T

*With 15 per cent. moisture.

But the value of a fuel depends also upon how much of the chemical energy which it contains can be utilized. Hard coal contains plenty of energy, but it would not be of much use to run a gasoline engine. Wheat straw contains fully as much chemical energy as corn meal but much of that energy cannot be used by the animal machine.

Two causes combine to affect the utilization of the chemical energy contained in feeding stuffs:

In the first place, more or less of the feed escapes from the body unburned. If a coal is of such quality that portions of it drop through the grate unconsumed, and if smoke and combustible gases are carried off through the stack, it is evident that a ton of it will supply far less heat to the boiler than it would if the combustion were perfect. The case of the feeding stuff is similar. Much of even the best feeding stuffs escapes digestion and is excreted in the dung, carrying with it a corresponding quantity of the chemical energy of the feed. More or less incompletely burned material is also contained in the urine, while ruminants, and to a certain extent horses, also give off combustible gases, arising from fermentations in the digestive tract. The amount of energy carried off in this way is very considerable. For example, about 22 per cent of the chemical energy of corn meal and fully 55 per cent of that of average hay, has been found to escape unused in the excreta.

In the second place, as already pointed out, the animal body has to extract its real fuel material from its feed, separating it from the relatively large proportion of useless material which it excretes. To effect this separation requires work and consumes energy, and this energy, of course, is not available for other purposes. The case is somewhat as if the gasoline engine had to distill its own gasoline and separate it from impurities. Moreover, when the animal eats more feed than is required simply to furnish energy to run its machinery, and hence is able to produce meat or milk, the process of converting the food into suitable forms to store up in the body seems to require a further expenditure of energy.

It is not, then, the total chemical energy contained in a feeding stuff which measures its value as fuel material to the body but what remains after deducting the losses in the unburned materials of the excreta and the energy expended in extracting the real fuel materials from the feed and transforming them into substances which the body can use or store up. For example, while one hundred pounds of corn meal contains, as stated, about 171 Therms of chemical energy, only about 89 Therms remain, after all these deductions have been made, to represent the actual value of the corn meal as a source of energy to the organism.

The Institute of Animal Nutrition is attempting to compare feeding stuffs for cattle by determining their relative values as sources of energy, measuring in the first place the total amount of energy contained in the feed and in the second place the amount of energy lost in the ways just indicated. For this purpose it is using an apparatus called a respiration calorimeter. The method is not unlike that employed by the Pennsylvania Railroad Company in its elaborate locomotive testing plant at Altoona, which some of you may have seen. In that plant a locomotive can be run at any desired speed and with any desired load under conditions which permit of the exact determination of the total energy supplied in the coal burned and of the precise yield of useful energy, in the pull on the drawbar, at every point of each revolution of the drivers.

Experiments with the respiration calorimeter are made much after the same plan. The food, which is the fuel of the animal, is weighed and the exact amount of energy which it contains is determined. The losses in the visible excreta of the animal, corresponding to unburned coal dropping through the grate, and those in the unburned gases given off, are determined. Finally, the amount of energy escaping from the animal in the form of heat and likewise the gases given off in the respiration of the animal, are accurately measured. The tests are in some respects more elaborate than those of the locomotive because the animal is an infinitely more complex machine, but the final result is much the same, viz., to enable us to trace exactly the use which the animal makes of the energy supplied to it. We test the value of a feeding stuff by feeding it to the animal, but we measure the results far more exactly and minutely than is possible in the ordinary feeding experiment.

As an indication of the opinion of competent scientific authorities as to the value of the methods of investigation which the Institute is using, it may not be inappropriate in this connection to call attention to the laboratory which the Carnegie Institution of Washington has just established in Boston for the study of human nutrition by practically the same methods which are being used at the State College in the study of animal nutrition. The equipment of that laboratory has cost about $140,000, or about seven times that of the Institute of Animal Nutrition. Its annual income is at present about $25,000, and the Director tells me he expects that it will be nearly doubled within a few years.

Much of the work of the Institute still remains unpublished through lack of force in the past to complete the necessary analyses and computations and to prepare the results for publication. From those which have been published, however, I may select a few items simply as illustrations of the kind of information which may be secured by this method and which could not possibly have been obtained from the ordinary feeding experiment.

It has been shown, for example, that only a part of the actual fuel value of the feed (after making all the deductions for unburned material) is really of use to run the animal mechanism. Thirty-seven per cent of the fuel value of timothy hay was found to be converted directly into heat which is of use to the animal only when exposed to a comparatively low temperature. It is as if 37 per cent of the energy of the coal burned in a locomotive served only to keep the engineer and fireman warm and only 63 per cent helped to make steam. With corn meal, 78 per cent of the fuel value was of use to the animal and only 22 per cent contributed to this surplus heat production. Consequently, a pound of digestible matter derived from corn meal is 21 per cent more valuable to support the operation of the animal machine than the same weight of digestible matter derived from timothy hay, while for the production of gain the difference appears to be even greater (about 56 per cent).

A consequence of this surplus heat production is that the requirements of domestic animals for fuel material are less affected by external temperature than has been commonly supposed. On heavy feed the surplus heat generated is so considerable that exposure to moderate cold, far from harming the animals, is advantageous, at least in the case of fattening cattle, in helping them to get rid of the excess of heat. This has its bearing also on the question of stable ventilation. If well-fed animals can be comfortable and produce good economic results in a comparatively low temperature, it is obvious that we can have better ventilation than if we must, for economic reasons, maintain a comparatively high temperature.

Another interesting result, which could not have been demonstrated by the ordinary feeding experiment, is the largely increased heat production of the standing as compared with the lying steer. From 30 to 40 per cent more of the fuel value of the feed is consumed in the former case than in the latter and the operator can tell almost as exactly from the indications of the calorimeter when the animal stands up or lies down as by watching the animal. The bearing of this upon the economy of comfortable quarters and freedom from disturbance is too obvious to require discussion.

Besides a study of various feeding stuffs as sources of energy to the animal, the Institute has also under way investigations upon some of the factors which influence the efficiency of the animal machine in converting crops into animal products. For example, the records of three years' work upon the influence of the age and type of beef steers upon the economy of gain are now being studied and prepared or publication.

But the final test of the results of any line of investigation is not their unusual or striking character but their capacity for being put to practical use. Service is always the real test of value. Do these studies of energy values yield results which can be used in actual feeding?

I believe that they do. While very much remains to be learned before we can claim to have even a fairly complete knowledge of the energy relations of the feed, enough has been accomplished in the past twenty-five years by the investigations of Rubner, Zuntz, Kellner and others in Europe and those of Atwater, Rosa, Woods, Benedict, and I think I may add our own, in this country, to demonstrate that the method still generally current of comparing feeding stuffs on the basis of the digestible matter which they contain is seriously erroneous and to furnish at least the beginnings of a reform.

Even did time permit, however, I could hardly venture to trespass upon your patience by undertaking on this occasion to show in detail how our present knowledge of the energy values of feeding stuffs and the energy requirements or farm animals can be applied in the actual computation of rations. Instead, I have assumed "leave to print," and refer you for a discussion of this branch of the subject to Farmers' Bulletin No. 346 of the U. S. Department of Agriculture, just published, in which I have tabulated the best available data as to the energy values of the more important feeding stuffs and have attempted to formulate the feed requirements of the various classes of farm animals in terms of protein and energy and to show how these data can be used in the computation of rations.

A perusal of this bulletin will make it apparent that so far as the arithmetical side of the matter is concerned the method of computation does not differ materially from that already in use and familiar to you all, except that it is perhaps a little more simple. It is merely applied to more exact data.

I have attempted to show that the problems upon which the Institute of Animal Nutrition is working are highly important ones; although elaborate, are distinctly practical in aim and are adapted to the solution of practical problems; and that the results are likely to be valuable in practice because those of similar investigations elsewhere have already proved their worth.

It must be admitted, however, that the advocate of scientific investigation is at a certain disadvantage when the question of the returns for the money expended is raised.

The experimenter who introduces a new crop or produces an improved variety finds it easy to show the financial value of his results. The entomologist who devises a new spraying material can demonstrate immediate advantages from its use. The agronomist who studies the fertilizer requirements of a soil type incorporates his results in bushels or tons of crop increase. These are the inventors in the field of agriculture, and their services have been priceless. On the other hand, the investigator who is endeavoring primarily to discover fundamental principles and laws finds it less easy to demonstrate tangible results. His products are ideas in the mind of the farmer rather than crops in his fields. He aims to assist the agriculturist to a better knowledge of his business rather than to give him specifics for this or that difficulty. The benefits resulting from such service are as intangible and as difficult to express in dollars and cents as are those of the public school system, yet who can doubt that if, for example, the owners of the hundred million dollars worth of live stock on the farms of Pennsylvania could be helped to a measurably better knowledge of the nature and mode of operation of the machines called animals which they are using the economic result to the State would amply justify the necessary expenditure?

I called attention a few months ago to the analogy between the respiration calorimeter and the locomotive testing plant of the Pennsylvania Railroad. That testing plant cost over $120,000. It would seem that the locomotive is such a well known machine that all that would be necessary to test its efficiency would be simply to put it out on the road, just as we might be inclined to suppose that all that is necessary to determine the efficiency of the steer or the cow is to feed it in the barn, and yet the Pennsylvania Railroad Company thinks it has paid well to spend $120,000 on a testing plant and other thousands in making highly scientific tests of this familiar machine. The Engineer of Tests says: "We are entirely satisfied that this investment and the cost of operation represent moneys wisely spent, as we are learning facts about locomotive performance which are of extreme value and which are the means of pointing out the way to obtain direct saving in the operation of the Pennsylvania Railroad." As compared with the animal machine, however, the locomotive is an extremely simple thing. I hope that I have at least succeeded in indicating to you that it is possible by tests of the animal to learn facts about animal performance which will be of extreme value to the stockmen of Pennsylvania, and which will point out the way to obtain direct saving in the operation of the farms of the Commonwealth.

The Pennsylvania Railroad owns locomotives to the value in round numbers of thirty-one million dollars. The value of the live stock on the farms of Pennsylvania is over one hundred million dollars. If it pays the Pennsylvania Railroad to permanently invest $120,000 to test the operation of thirty-one million dollars worth of locomotives, how much will it pay the Commonwealth of Pennsylvania to invest in testing the operation of its one hundred million dollars worth of live stock? An investment corresponding to that of the Railroad Company would be $397,000.

The Pennsylvania Railroad estimates the physical value of its property, including cost of road, real estate, equipment and terminal property at two hundred and ninety million dollars. The value of the farm property in Pennsylvania is put by the last census at more than a thousand million dollars. An investment in an animal testing plant in proportion to that of the railroad company in its locomotive testing plant would amount to $434,000.

The gross income of the railroad company last year was fifty million dollars. The gross income of the farms of the state, as represented by the value of farm products, is over two hundred million dollars. On the basis of income, therefore, a proportionate investment in an animal testing plant would amount to $499,000.

It appears, then, that whether we base the comparison on the value of the equipment to be tested, upon the total value of the property or upon the gross receipts of the business, an investment by the state comparable to that of the Pennsylvania Railroad Company would be from $400,000 to $500,000. Three-quarters of that sum invested at 5 per cent would permanently endow the Institute of Animal Nutrition and put its work on a sound and fairly satisfactory basis.

Now it is for you, and for the farmers of the State generally, to say whether you want these investigations in animal nutrition continued. Legislators, Governors and Trustees alike are simply your representatives.

So far as the Trustees of the College are concerned there can be no question as to their attitude. I do not know, of course, what they will do in the future, but I do know what they have done in the past. For the last two years, although they have had no specific appropriation for this work and have been compelled to face serious financial difficulties they have nevertheless said: "Go on with the work, pay the necessary salaries, order the absolutely essential equipment, and we will in some way find the means to pay for it." In the light of this exceedingly practical expression of their judgment as to the importance of the work, I have not the slightest doubt as to what they will wish to do. What they can do will depend to a very large extent upon the support which they receive before the Legislature and the Governor from you and those whom you represent.

The authorities of the Commonwealth of Pennsylvania are not stingy. They desire to deal liberally with the agricultural interests. But it is your money which they are expending and they would be false to the trust reposed in them if they did not inquire whether the objects of expenditure proposed to them are such as you approve. The particular institution for agricultural research which I represent here, like every other, while it must ask the farmer to take some things on trust and to have faith in the ultimate usefulness of scientific results, must make its final appeal to the sober, common-sense judgment of the plain people. Gentlemen, the responsibility for the future of these investigations rests with you.

THE CORN SHOW

There was a magnificent display of corn in competition for the cups and cash prizes offered by the Pennsylvania Live Stock Breeders' Association and its friends. A double row of tables extending the entire length of the great skating rink showed the grain, but not without some crowding. The photograph on next page shows the exhibit, but fails to give an adequate idea of its length.

Prof. F. A. Gardner, of Pennsylvania State College, with Dean Thos. F. Hunt in consultation, made the awards, which are given in full below. An interesting fact was that the Grand Champion award went to corn of the same variety and strain as that which won first and second and the championship the previous year under another judge. It was a hard task to decide the ear championship, an ear from Mr. Strosnider's champion lot of Leaming and an ear from Mr. Eisiminger's third prize lot of Funk's Leaming causing the trouble, and also being responsible for the error in press reports as to the results. Mr. Eisiminger's ear was finally decided to have a fraction the best of it. Entry blanks showing the name of variety, source of seed, time of planting, cutting, fertilizer used, character of soil, elevation above sea level, original tree growth on soil, etc., gave information to all after the awards had been made. The prize corn was auctioned off Thursday afternoon. The champion ear was sold by Prof. C. W. Burkett after a stirring speech on seed corn. The purchaser was Samuel R. Ludwig, of New York City, and the price $15. The Grand Champion corn went to Dr. J. Stewart Lacock, of Pittsburg, for $20, he presenting it to the Pennsylvania Test Farm. The second prize Yellow Dent corn, a splendid specimen from Chester county, brought $15. The Yellow Dent class was so large that it was quite an honor to get in the first ten places. So much corn was received that could not be strictly classed as Yellow Dent or White-Capped Yellow Dent that a new class was made and this corn entered there, as it had no chance to win in other classes. The Grange Show was confined to one Grange, and no cups were awarded.

Yellow Dent—First, George G. Strosnider, Waynesburg (Silver Cup presented by Dr. Thomas Turnbull, Pittsburg); second, G. Martin Cloud, Kennett Square; third, Jesse L. Eisiminger, Waynesburg; fourth, J. R. Fritz, Duncannon; fifth, William H. Grim, Hamburg; sixth, C. B. McConnell, Sharpsville; seventh, Clarence Mellinger, Ronk; eighth, J. B. Henderson, Burgettstown; ninth, Harry E. Dietz, Mechanicsburg; tenth, C. L. Taggart, Washington.

White Dent—First, Charles A. Row, Yardley (Silver Cup presented by the Faculty of the Veterinary College of the University of Pennsylvania, Philadelphia); second, G. A. Trimmer, Mechanicsburg; third, L. W. Kintigh, Irwin; fourth, Lee L. Trimmer, Mechanicsburg; fifth, C. H. Deckard, Newport; sixth, S. E. Musselman, Allen; seventh, W. M. Thompson, Uniontown; eighth, Evan R. Styer, Glenmoore; ninth, George O. Souder, Dillsburg; tenth, A. C. Slifer, Lewisburg.

White-Capped Yellow Dent—First, J. P. Dentler, Turbotville (Silver Cup presented by Faculty of Pennsylvania Agricultural College, State College, Pa.); second, A. T. Holman, Millerstown; third, Harry B. Herr, Lancaster; fourth, Chas. A. Row, Yardley; fifth, A. C. Slifer, Lewisburg; sixth, Jasper M. Thompson, Uniontown; seventh, James W. McCann, Fredonia; eighth, H. M. Welton, Sandy Lake; ninth, F. W. Levis, Chadd's Ford; tenth, Estate of Samuel J. S. Sharpless, Westtown.

Ninety-Day Type—First, Post Bros., West Alexander (Silver Cup presented by Department of Agriculture, Harrisburg, Pa.); second, G. Martin Cloud, Kennett Square; third, B. F. Gabler & Son, Greensboro; fourth, G. A. Trimmer, Mechanicsburg; fifth, Harry C. Trexler, Allentown; sixth, F. G. & W. A. McCoy, Mercer; seventh, W. T. Phillipy, Carlisle; eighth, J. H. Allison, Mercer; ninth, Anna C. Betts, Buckmanville; tenth, Fred Backhaus, DeHaven.

Flint—First, J. H. Ferris, Little Marsh (Silver Cup presented by Hon. Vance C. McCormick, Harrisburg, Pa.); second, Harry Rockwell, Canton; third, Joseph C. McCann, Fredonia; fourth, J. H. Bostwick, Jackson Center; fifth, Oliver D. Spencer, Wellsboro; sixth, C. E. Bronson, Alderson; seventh, J. H. Bowman, Towanda; eighth, J. D. McKnight, Bakerstown; ninth, C. F. Reynolds, Tioga; tenth, John J. Ayers, Gillett.

Mixed Varieties—First, G. W. Tilton, Claysville (Silver Cup presented by Hon. Vance C. McCormick); second, S. E. Musselman, Allen; third, A. B. Grove, Chambersburg; fourth, Harry B. Herr, Lancaster; fifth, Paul M. Bitner, Shiremanstown.

Grand Champion—Best ten ears in show—George G. Strosnider, Waynesburg. (Cup presented by The American Agriculturist, New York, N. Y.)

Best Ear in Show—Jesse L. Eisiminger, Waynesburg. (Plate presented by R. F. Shannon, Pittsburg, Pa.)

Reports of Corn Growers.

Unfortunately many of the entry blanks containing information about the corn on exhibition were lost in the confusion incident to the sale of the prize corn. The following winners of leading prizes, in response to request made by mail, have sent in blanks subsequent to the show:

Grand Champion Ten Ears.

George G. Strosnider, Waynesburg, Greene county, Pa.:

Name of variety—Improved Leaming.

Source of seed—J. S. McNary, 1885.

When planted—May 10th.

When cut—October 1st.

Fertilizer or manure used, kind and quantity per acre—Straw; plowed under.

Elevation above sea level (if known)—About 1,000 feet.

Character of soil—Limestone, rolling.

Character of original tree growth—Sugar, Walnut.

Mr. Strosnider has bred this strain of corn since 1885, when he got the seed. It is now much larger than original seed, which Mr. McNary got from the originator of the Leaming corn.

Second Prize Yellow Dent.

G. Martin Cloud, Kennett Square, Pa., makes the following report:

Source of seed—Own seed for 28 years.

When planted—May 14th.

When cut—About September 20th.

Fertilizer or manure used, kind and quantity per acre—No manure. (Barn was burned and had no manure.) 200 pounds steamed bone.

Elevation above sea level (if known)—450 feet.

Character of soil—Gravelly clay loam, with clay subsoil well drained, mostly flint stone.

Character of original tree growth—Chestnut, white and black oak.

White Dent—First Prize.

Chas. A. Row, Yardley, Bucks County, Pa., who won first prize in the class for White Dent, makes the following report:

Name of variety—Boone County Special.

Source of seed—Illinois.

When planted—May 5th.

When cut—September 25th to 30th.

Fertilizer or manure used, kind and quantity per acre—Barn-yard manure; 250 pounds of high-grade fertilizer per acre.

Elevation above sea level (if known)—100 feet.

Character of soil—Loam, granite (native). Natural drainage, very good.

Character of original tree growth—Oak and chestnut.

Mr. Row adds:—

"The White Cap Yellow Dent which won fourth prize was grown under the same conditions, except that the seed has been saved by us for years. We would like to be with you another year if possible."

White Dent—Second Prize.

G. A. Trimmer, Mechanicsburg, Cumberland county, makes the following report:

Name of variety—Snow-White Dent.

Source of seed—Grown by self.

When planted—Middle of May.

When cut—Middle of September.

Fertilizer or manure used, kind and quantity per acre—Barn-yard manure and 150 pounds commercial fertilizer.

Elevation above sea level (if known)—450 feet.

Character of soil—Slate, rolling, well drained; chestnut loam, with flint rock.

Character of original tree growth—Chestnut.

White Capped Yellow Dent—First Prize.

Mr. J. P. Dentler, Turbotville, Northumberland county, who exhibited corn successfully at all of our shows, died May 31st. The following report of his corn was made for the show and duplicated later by Mrs. Dentler:

Name of variety—White Cap Yellow Dent.

Source of seed—From own farm.

When planted—May 13th.

When cut—September 7th.

Fertilizer or manure used, kind and quantity per acre—Barn-yard manure.

Character of soil—Limestone, well drained; rolling, not hilly.

Character of original tree growth—Oak.

October 30 shelled and hauled to market.

White Capped Yellow Dent—Second Prize.

A. T. Holman, Millerstown, Perry county, winner of second prize, makes this report:

Name of variety—White Cap Yellow Dent.

Source of seed—Home-grown.

When planted—May 13, 1908.

When cut—October 1st.

Fertilizer or manure used, kind and quantity per acre—Clover sod.

Elevation above sea level (if known)—500 feet.

Character of soil—Limestone clay.

Character of original tree growth—Oak.

Ninety-Day Type.

G. Martin Cloud, winner of second prize, reports:

Source of seed—Own seed for 25 years. (Originally from New York.)

When planted—May 14th.

When cut—About September 1st.

Fertilizer or manure used, kind and quantity per acre—200 pounds of steamed bone.

Elevation above sea level (if known)—450 feet.

Character of soil—Gravelly clay loam with clay subsoil, well drained; mostly flint stone.

Character of original tree growth—Chestnut, white and black oak.

Mixed Varieties—First Prize.

G. W. Tilton, Claysville, Washington county, writes:

"In regard to the corn on which I received first prize at Harrisburg it is a result of my own personal experimenting for several years. I first started with three of the best varieties I could find, namely: Chester County Mammoth Early Dent, the Improved Leaming and the Arlington. My aim from the first was to obtain a long ear with deep, broad grains and a moderate size cob that would mature in a reasonable length of time. The stalk is large and strong with abundance of foliage and deep-seated roots. I have carried out my aims and find that only a large, strong stalk is capable of producing a large ear, and by so doing have raised ears measuring 15 inches long with half-inch grains. The land from which I received my prize corn was on a hillside facing the northeast, and is about 1,400 feet above sea level. The soil is a mixture of sandstone and limestone, but the majority of this field was limestone. I used no fertilizer of any kind. I did not plow the field early but ploughed to the depth of eight inches. The ground was put in fine shape before planting and then planted on May 20, in rows 3 feet, 4 inches apart, drilling one grain every 15 inches in the row. I cultivated the corn shallow four times, the last time being when the corn was 5 feet high, just after cutting wheat, and consider the last working did more good than the other three, but of course the corn must have these as well as the last one. The corn was cut on September 14th; husked and cribbed in fine shape by October 20, 1908."

S. E. Musselman, Allen, Pa., reports:

Name of variety—Mammoth.

When planted—May 12th.

When cut—September 24th.

Fertilizer or manure used, kind and quantity per acre—None.

Elevation above sea level (if known)—Near Harrisburg.

Character of soil—Limestone and sand.

Flint—First Prize.

J. H. Ferris, Little Marsh, Tioga county, says that his corn was cultivated seven times and hoed once, and reports as below :

Name of variety—Improved Dutton.

Source of seed—Raised on farm.

When planted—May 28, 1908.

When cut—September 15, 1908.

Fertilizer or manure used, kind and quantity per acre—Manure, seven loads.

Elevation above sea level (if known)—1,400 feet.

Character of soil—Sod ground plowed in the spring; sandy loam.

Flint—Second Prize.

Harry Rockwell, Canton, Bradford county, writes:

Our corn ground was ploughed in the fall and manured in the winter and early spring, harrowed three times before planting, given good cultivation. Level culture was followed. Corn was cut and shocked in the usual way and husked in the field.

Name of variety—Smoky Valley.

Source of seed—Home-grown.

When planted—May 22nd.

When cut—September 4th.

Fertilizer or manure used, kind and quantity per acre—Stable manure, eight loads per acre.

Character of soil—Red shale, well drained, gravelly.

Character of original tree growth—Pine.

OTHER CORN WORK.

The Pennsylvania Live Stock Breeders' Association, realizing that the great corn problem is to produce more corn per acre, has inaugurated a Corn-Growing Contest under the following conditions and regulations:

For the Best Acre of Corn. Any Type or Variety, Grown by a Pensylvania Farmer in 1909.

CONDITIONS.

1—In awarding prizes yield shall count 70 points; cost of production 20 points; sample of corn shown at Annual Corn Show 5 points; completeness and accuracy of report 5 points.

2—This contest is open to any Pennsylvania farmer, his son, daughter, ward or employe. Seedsmen and their families and employes are barred.

3—One measured acre, either a part of a field or separate, must be entered. This acre must be completely surrounded by at least one row of corn not more than 3 feet 8 inches from the boundary of the measured acre.

4—The contestant has entire freedom in preparation of ground, use of fertilizers, seed, planting, cultivation, etc.

5—The corn on the measured acre shall be husked standing after all corn adjoining it shall have been cut and shocked or removed.

6—The corn shall be husked and weighed in the presence of two witnesses approved by the Secretary of the Pennsylvania Live Stock Breeders' Association. But corn shall not be husked until said witnesses shall certify that it is fit to crib along with main crop.

7—Fifteen ears of the crop shall be exhibited at the Fourth Annual Corn Show of the Pennsylvania Live Stock Breeders' Association, due notice of which will be given.

8—Judges: Dean Thos. F. Hunt and Prof. F. D. Gardner, Pennsylvania Agricultural College.

Names of witnesses should be submitted for paproval to E. S. Bayard, 203 Shady Avenue, Pittsburgh, in plenty of time to forward them their instructions.

Entry blanks, forms for report, etc., will be furnished all contestants.

E. S. BAYARD, Sec'y.
203 Shady Ave., E. E., Pittsburgh, Pa.

Thirty in Contest.

Thirty farmers are growing an acre apiece in this contest, and the corn will be shown and reports made at the next annual meeting. Three gentlemen are also testing Mr. Strosnider's Grand Champion corn, he having kindly furnished them the seed free. Their reports will also be made at the next annual meeting.

Suggestions Wanted.

The Secretary realizes that previous shows of corn have been far from perfect and has endeavored to profit by suggestions made. The making of equitable rules for a corn-growing contest has been no easy task, and suggestions are in order here also.

We ought to have a thousand Pennsylvania farmers growing an acre of corn, keeping a record of its cost and showing their product and their records annually, instead of thirty. If the fault lies in the rules or conditions of the contest we want to know it. It has been found impossible, on account of variation in altitude, to district the state so that all growers might compete on a more nearly equal basis.

HORSES.

PERCHERONS.

Name. Postoffice. County.
J. H. Kidd.....................Mars, Butler
D. S. Kloss...................Tyrone, Blair
A. M. Dickson & Son.Cochranton, Crawf'd
Geo. A. Hogg..24th & R. R. Sts., Pittsburg
F. W. & W. A. McCoy....Mercer, Mercer
Powell Bros..........Shadeland, Crawford
Wm. F. Gable..........Wyebrook, Chester
H. M. Lyon & Sons..Wyalusing, Bradford
J. F. Lantz & Co.......Glenmoore, Chester
Nelson Poorbaugh.Mt. Pleasant, Westm'd

STANDARD-BRED.

Peter B. Cowan....... ....Brookville, Jeff.
W. C. Norton............Waymart, Wayne
Jas. Blair (Carriage type).Hartstown,Crf'd
Henry Palmer............Avondale. Chester
Powell Bros..........Shadeland, Crawford

SHIRE.

Geo. A. Hogg..24th & R. R. Sts., Pittsburg
Powell Bros..........Shadeland, Crawford

SHETLAND PONIES.

Wm. F. Gable..........Wyebrook, Chester
W. M. Thompson.....Uniontown, Fayette
Powell Bros..........Shadeland. Crawford

HACKNEYS.

Geo. A. Hogg..24th & R. R. Sts., Pittsburg
Powell Bros..........Shadeland, Crawford

THOROUGHBREDS.

R. S. Hartley........Youngsville, Warren

BELGIAN.

Powell Bros..........Shadeland, Crawford
W. H. Baldridge..Latrobe, Westmoreland
Benj. B. Baird..McClellandtown, Fayette

CLYDESDALE.

Powell Bros..........Shadeland, Crawford
G. W. Carroll & Sons.Jackson Centre. Mcr
Penshurst Farm...Narberth, Montgomery

ARABS.

Herman Hoopes.....Westchester, Chester

MORGANS.

Geo. A. Hogg..24th & R. R. Sts., Pittsburg
A. R. Van Tassel.......Dubois. Clearfield

CLEVELAND BAY.

Powell Bros..........Shadeland, Crawford

FRENCH COACH.

Powell Bros......... Shadeland. Crawford

SUFFOLK PUNCH.

Powell Bros..........Shadeland, Crawford

FRENCH DRAFT.

Powell Bros..........Shadeland. Crawford

CATTLE.

ABERDEEN-ANGUS.

C. L. Taggart...Washington, Washington
Jas. Blair.............Hartstown, Crawford
Bayard Bros..........Waynesburg, Greene
Geo. Black.............Dayton, Armstrong

AYRSHIRES.

W. W. Blake Arkcoll.......Paoli, Chester
E. L. & Sidney Roberts..Malvern, Chester
Geo. A.. Dick.................Kane, McKean
W. F. Throop..Espyville Station, Crawf'd
Penshurst Farm...Narberth, Montgomery

BROWN SWISS.

W. H. H. Riddle............Butler, Butler
A. M. Dickson & Son.Cochranton, Crawf'd

DEVONS.

A. S. Worden...............Frederick, Md.
Powell Bros...........Shadeland, Crawford

POLLED ALBIONS.

B. E. Ferris................Hector, Potter

HOLSTEINS.

Herman Straub......Pittsburg, Allegheny
T. J. Erdley.............Lewisburg, Union
W. T. Suter...Riverside, Northumberland
H. M. Lyon & Sons..Wyalusing, Bradford
J. B. Henderson..Burgettstown, Wash'g'n
A. S. Worden...............Frederick, Md.
Geo. G. Paxton.....Houston, Washington
D. S. Kloss...................Tyrone, Blair
J. M. Quivey & Son.Houston, Washington
Powell Bros...........Shadeland, Crawford
D. E. Notestine.........Lewistown, Mifflin
Nelson Poorbaugh....Mt. Pleasant, West'd
F. W. Levis........Chadd's Ford, Chester
W. M. Benninger..Benningers, North'pt'n
W. F. Throop..Espyville Station, Crawf'd

POLLED DURHAMS.

Lee R. Scott..Burgettstown, Washington

HEREFORDS.

G. W. Carroll & Sons.Jackson Centre, Mcr

RED POLLS.

M. G. King..................Mt. Wolf, York
A. M. Dickson & Son.Cochranton, Crawf'd
D. Norman App.......Selinsgrove, Snyder
John F. Zook............Belleville, Mifflin
Sidney T. Isett..Spruce Creek, Huntingdon

SHORTHORNS.

W. J. Sturgeon.....Kittanning, Armstrong
C. A. Hershey................Tillie, Adams
W. M. Thompson.....Uniontown, Fayette

John A. Cummins....Waynesburg, Greene
J. L. Stouffer...Southwest, Westmoreland
A. S. Eagleson & Sons.Washington, Wash.
W. J. Monroe..Greensburg, Westmoreland
W. C. Black.................Mercer, Mercer
Post Bros..........West Alexander, Wash.
F. W. & W. A. McCoy....Mercer, Mercer
Lee R. Scott...Burgettstown, Washington
L. D. May......Granville Center, Bradford
R. C. Vance...Burgettstown, Washington
R. L. Munce.....Canonsburg, Washington
Benj. B. Baird...McClellandtown, Fayette

GUERNSEYS.

W. H. Ridge.................Trevose, Bucks
R. S. Nicholson & Sons.Kittanning, Arm'g
B. F. Gabler & Son....Greensboro, Greene
Nelson Poorbaugh..Mt. Pleasant,Westm'd
Wm. F. Gable..........Wyebrook, Chester
R. S. Hartley.........Youngsville, Warren
H. H. Snavely...Willow Street, Lancaster
Geo. G. Paxton.....Houston, Washington
Henry Palmer...........Avondale, Chester
R. S. Love....Mt. Pleasant, Westmoreland
Shook Bros............Spring Mills, Center
Ezra Michener............Michener, Bucks
H. D. Conley.................Etters, York
J. F. Lantz & Co......Glenmoore, Chester

JERSEYS.

R. S. Love....Mt. Pleasant, Westmoreland
R. S. Nicholson & Sons.Kittanning, Arm'g
Jno. W. Bronson.....New Galilee, Beaver
R. Y. Filbert...................Philadelphia
W. F. Shrum....Jeannette, Westmoreland
M. P. Shoemaker & Bro.Greensburg, West.
R. S. Hartley.........Youngsville, Warren
W. E. & J. J. Perham.....Niagara, Wayne
W. C. Norton............Waymart, Wayne
S. E. Nivin...........Landenburg, Chester
W. F. Wagner....Harrison City, Westm'd
Herman Hoopes.....Westchester, Chester
W. W. Harrison.119 N.11th St.,Philadelphia
R. F. Shannon............Pittsburg, All'y
J. B. Wylie.......Washington, Washington
J. H. Silvis.....Greensburg, Westmoreland
B. P. Steele............McVeytown, Mifflin
Penshurst Farm...Narberth, Montgomery

SHEEP.

BLACTOP MERINOS.

John M. Berry..Wylandville, Washington
R. L. Munce.....Canonsburg, Washington

DELAINE MERINOS.

Geo. G. Paxton.....Houston, Washington
Lee R. Scott..Burgettstown, Washington
R.W.Crothers & Son...Taylorstown, Wash.
A. L. Martin.......Enon Valley, Lawrence

CHEVIOTS.

A. M. Dickson & Son..Cochranton. Crawf'd

SOUTHDOWNS.

R. Y. Filbert...................Philadelphia
F. W. & W. A. McCoy....Mercer, Mercer
R. C. Vance....Burgettstown, Washington
W. M. Benninger...Benningers, North'p'n

DORSETS.

A. S. Eagleson & Son.Washington, Wash.
J. B. Henderson..Burgettstown, Wash'g'n
S. Shaffer............New Castle, Lawrence
J. B. Wylie......Washington, Washington
Henry Palmer...........Avondale, Chester

SHROPSHIRES.

J. F. Lantz & Co......Glenmoore, Chester
Wm. F. Gable..........Wyebrook, Chester
C. A. Hershey................Tillie, Adams
S. Shaffer...........New Castle, Lawrence
Jos. T. Fleming...........Belleville, Mifflin
W. C. Black.................Mercer, Mercer
Sidney T. Isett..Spruce Creek, Huntingd'n
Herman Hoopes.....Westchester, Chester
D. S. Kloss....................Tyrone, Blair
D. W. Jones..............Wilmore, Cambria
B. P. Steele............McVeytown, Mifflin
Penshurst Farm...Narberth, Montgomery

LINCOLNS.

R. S. Nicholson & Sons.Kittanning, Arm'g
F. W. & W. A. McCoy.....Mercer, Mercer

HAMPSHIRES.

W. J. Monroe..Greensburg, Westmoreland
Jas. Blair.............Hartstown, Crawford
A. M. Dickson & Son..Cochranton, Craw'd
John F. Zook..............Belleville, Mifflin

COTSWOLDS.

R. S. Love....Mt. Pleasant, Westmoreland

TUNIS.

A. M. Dickson & Son..Cochranton, Craw'd

OXFORDS.

A. M. Dickson & Son..Cochranton, Craw'd
A. S. Worden................Frederick, Md.

SPANISH MERINOS.

Lee R. Scott...Burgettstown, Washington

LEICESTERS.

F. W. & W. A. McCoy.....Mercer, Mercer

SUFFOLK.

A. M. Dickson & Son..Cochranton, Craw'd

BLACKFACED HIGHLAND.

A. M. Dickson & Son..Cochranton, Craw'd

ANGORA GOATS.

R. S. Love....Mt. Pleasant, Westmoreland
A. M. Dickson & Son..Cochranton, Craw'd

POULTRY.

PLYMOUTH ROCKS.

Edwin Johnson.........Taylorsville, Bucks
Jno. W. Bronson (B)..New Galilee, Beaver
Herman Straub (B)..Pittsburg, Allegheny
W. T. Kennedy.................Mars, Butler
W. J. Monroe (B)......Greensburg, West'd
W. T. Suter (W)....Riverside, Northumb'd
M. N. Clark (B)..Claridge, Westmoreland
J. F. Lantz & Co.....Glenmoore, Chester
D. N. App (B&W)....Selinsgrove, Snyder
C. A. Hershey (B).............Tillie, Adams
M.P.Shoemaker&Bro.(W).Greensbg, West.
H. M. Lyon & Sons(B)..Wyalusing, Bradf'd
D. W. Jones.............Wilmore, Cambria
Geo. S. Barnhart....Greensburg, Westm'd
Sydney T. Isett.Spruce Creek, Huntingdon
John A. Cummins(B).Waynesburg, Greene
W. F. Wagner (B)..Harrison City, West'd
J. L. Stouffer (B).....Southwest, Westm'd
Jos. T. Fleming (Wh)....Belleville, Mifflin
Burns & Adams (B)...Imperial, Allegheny
J. H. Peachey (B)........Belleville, Mifflin
Herman Hoopes (B)..Westchester, Chester
A.S.Eagleson&Sons(B).Washingt'n, Wash.
R. S. Love (W).....Mt. Pleasant, Westm'd
J. H. Silvis...Greensburg, Westmoreland
D. E. Notestine.........Lewistown, Mifflin
Shook Bros............Spring Mills, Center
F. W. & W. A. McCoy(Wh).Mercer, Mercer
W. M. Benninger (Wh).Benningers, N'th'n
Penshurst Farm (B)...Narberth, Montg'y
A. L. Martin.......Enon Valley, Lawrence

COCHINS.

John M. Berry (Wh)..Wylandville, Wash.

RHODE ISLAND REDS.

R. F. Shannon (R.C.).....Pittsburg, All'y
W. H. Knarr (S.C.)..Greensburg, Westm'd
D. Norman App........Selinsgrove, Snyder
D. W. Jones.............Wilmore, Cambria
S. Shaffer...........New Castle, Lawrence
W. W. Blake Arkcoll.......Paoli, Chester
B. P. Steele (B.C.).....McVeytown, Mifflin
W. J. Sturgeon....Kittanning, Armstrong

ORPINGTONS.

Geo. Black (Bf)........Dayton, Armstrong

WYANDOTTES.

Dr. Carl W. Gay(Bf).Swarthmore,Delaw'e
S. Shaffer (Wh).....New Castle, Lawrence
R. S. Nicholson & Sons.Kittanning, Arm'g
Herman Straub(Wb)..Pittsburg, Allegheny
R.W.Crothers & Son(W).Taylorst'n, Wash.
Wm. F. Gable (Bf).....Wyebrook, Chester
C. A. Hershey (Wh)..........Tillie, Adams
D. W. Jones (Wh)........Wilmore, Cambria
H. H. Snavely (Wh).Willow St., Lancaster
D. S. Kloss (Wh)..............Tyrone, Blair
Ezra Michener (C&Wh)...Michener, Bucks
R. S. Love (W).Mt. Pleasant, Westmorel'd
Penshurst Farm (Wh)..Narberth, Montg'y

HAMBURGS.

Dr. Carl W.Gay(SS).Swarthmore,Delaware

MINORCAS.

Wm. F. Gable...........Wyebrook, Chester
R. S. Hartley..........Youngsville, Warren
R. F. Shannon(Bl)..Edgeworth Sta., Ally.

BRAHMAS.

J. D. Nevius (Lt)....Philadelphia, Phila.

LEGHORNS.

R. F. Shannon (Bl)..Edgeworth Sta., Ally.
W. T. Suter (RCW).Riverside, Northum'd
G. S. Barnhart (Bf)..Greensburg, West'd
R. L. Munce (SC)......Canonsburg, Wash.
Nelson Poorbaugh(Wh).Mt.Pleasant,West.
M. P. Shoemaker & Bro.(Br)..Greensburg
R.S.Hartley (Bf&Br)..Youngsville, Warren
Post Bros (RCB)...W. Alexander, Wash.
R. S. Love (W)....Mt. Pleasant, Westm'd
Jos. T. Fleming (SCB)..Belleville, Mifflin
Dr. Carl W. Gay (SC)..Swarthmore, Del.
W.F.Throop(SCW).Espyville Sta., Cr'wf'd

BANTAMS.

R. S. Hartley (Bf C)..Youngsville, Warren

GAMES.

Dr. Carl W. Gay..Swarthmore, Delaware
Herman Hoopes......Westchester, Chester
Post Bros......West Alexander, Wash'g'n

PEAFOWLS.

F. W. & W. A. McCoy.....Mercer, Mercer
D. W. Jones............Wilmore, Cambria

GUINEAS.

R. S. Nicholson & Sons..Kittanning, Arm'g

DUCKS.

G. I. Fugate (Mus)......Ellsworth, Wash.
F. W. & W. A. McCoy (Pekin).Mercer, M'r

TURKEYS.

Jno. M. Berry (WhH)..Wylandville, Wash.
D. N. App (WhH).....Selinsgrove, Snyder
J. L. Stouffer (MB)...Southwest, Westm'd
J. B. Wylie (WhH)...Washington, Wash.
F. W. & W. A. McCoy(WH).Mercer. Merc'r
D. W. Jones (MB)........Wilmore, Cambria

GEESE.

W. J. Monroe (Tou)...Greensburg, West'd

BLUE SPANISH.

G. I. Fugate........Ellsworth, Washington

SWINE.

BERKSHIRES

Jno. W. Bronson.....New Galilee, Beaver
T. J. Erdley..............Lewisburg, Union
W. T. Kennedy.................Mars, Butler
J. H. Silvis....Greensburg. Westmoreland
A. L. Martin.......Enon Valley, Lawrence
A. S. Worden................Frederick, Md.
R. W. Crothers & Son..Taylorst'n, Wash.
Nelson Poorbaugh.Mt. Pleasant, Westm'd
Jas. L. Henderson..Washington, Wash't'n
Geo. A. Dick................Kane, McKean
W. C. Black..................Mercer, Mercer
R. F. Shannon.......Pittsburg, Allegheny
A. S. Eagleson & Sons..Washington, Wash.
T. J. Erdley..............Lewisburg, Union
W. M. Benninger...Benningers, North'p'n
Penshurst Farm...Narberth, Montgomery
John A. Cummins....Waynesburg, Greene

DUROC-JERSEYS.

Post Bros..........West Alexander, Wash.
George Black............Dayton, Armstrong
D. E. Notestine..........Lewistown, Mifflin
Sidney T. Isett.Spruce Creek, Huntingdon
G. I. Fugate........Ellsworth, Washington
R. S. Nicholson & Sons..Kittanning, Arm'g
W. M. Benninger.Benningers, Northampt'n

CHESTER WHITES.

Peter B. Cowan.......Brookville, Jefferson
Herman Straub......Pittsburg, Allegheny
G. S. Barnhart.......Greensburg, Westm'd
R. L. Munce......Canonsburg, Washington
W. F. Gable............Wyebrook, Chester
F. W. Levis..........Chadd's Ford, Chester
Jos. T. Fleming...........Belleville, Mifflin
W. J. Monroe.Greensburg, Westmoreland
D. S. Kloss....................Tyrone, Blair
Sidney T. Isett.Spruce Creek, Huntingdon
F. W. & W. A. McCoy....Mercer, Mercer
D. W. Jones............Wilmore, Cambria
H. D. Conley...................Etters, York
W. M. Benninger.Benningers, Northampt'n
J. F. Lantz & Co......Glenmoore, Chester
H. H. Snavely....Willow Street, Lancaster

OZARK OR MULE FOOT HOGS.

A. M. Dickson & Son..Cochranton, Craw'd

POLAND-CHINAS.

G. I. Fugate.......Ellsworth, Washington
W. J. Sturgeon....Kittanning, Armstrong
W. M. Thompson.....Uniontown, Fayette
D. Norman App........Selinsgrove, Snyder
C. A. Hershey..................Tillie, Adams
W. F. Wagner....Harrison City, Westm'd
J. L. Stouffer...Southwest, Westmoreland
Burns & Adams........Imperial, Allegheny
J. H. Peachey.............Belleville, Mifflin
R. S. Love....Mt. Pleasant, Westmoreland
H. H. Snavely..Willow Street, Lancaster
B. P. Steele............McVeytown, Mifflin
Benj. B. Baird...McClellandtown, Fayette

ESSEX.

W. F. Throop..Espyville Station, Crawf'd

CHESHIRES.

B. F. Gabler & Son....Greensboro, Greene

TAMWORTHS.

R. S. Hartley..........Youngsville, Warren
Henry Palmer............Avondale, Chester
W. F. Throop..Espyville Station, Crawf'd

DOGS.

SCOTCH COLLIES.

D. W. Jones............Wilmore, Cambria
M. P. Shoemaker & Bro.Greensburg, West.
R. S. Hartley..........Youngsville, Warren

SCOTCH TERRIERS.

R. F. Shannon........Pittsburg, Allegheny

AIREDALE TERRIERS.

R. F. Shannon........Pittsburg, Allegheny

ANGORA CATS.

E. L. & Sidney Roberts..Malvern, Chester

GUINEA PIGS.

W. F. Throop....Espyville Sta., Crawford

CARRIER PIGEONS.

A. M. Dickson & Son..Cochranton, Craw'd

END OF YEAR